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USSR Report

CHEMISTRY

No. 71

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PESTICIDES

UDC 547.562; 632.934

SYNTHESIS OF ANALOGS OF A JUVENILE HORMONE 2. ALKYLATION OF SUBSTITUTED PHENOLS BY GERANYLDIMETHYLPHENYLAMMONIUM CHLORIDE

Tallin IZVESTIYA AKADEMII NAUK ESTONSKOY SSR-SERIYA KHIMIYA in Russian No 4, 1979 submitted 26 Feb 79 pp 257-260

KOGERMAN, A., AMMON, KADRI, RANG, H. and LAATS, K., Estonian SSR Academy of Sciences Institute of Chemistry

[Abstract] A method of synthesis of substituted phenyl geranyl ethers based on synthetic geranylchloride and produced by reactions of telomerization of isoprene was discussed. Geranylchloride was isolated from products of the reaction of telomerization by selective conversion under the effect of dimethylanaline in a quaternary ammonium salt, which uses for alkylation corresponding substituted phenols in an aqueous medium in the presence of NaOH. Eleven phenyl geranyl ethers were produced by this method. References 14: 10 Russian, 4 Western.
[80-2791]

UDC 632.954:633.8

THE DETERMINATION OF TRIAZINE HERBICIDES IN ESSENTIAL OILS AND IN PLANTS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 57-59

BARANOV, YU. S. and KHILIK, L. A. [All-Union Scientific Research Institute of Essential Oil Cultures] and KLISENKO, M. A. [All-Union Scientific Research Institute GINTOKS]

[Abstract] A sensitive method was developed for the detection and determination of atrazine, symazine, igran and prometrin in essential oils from lavender, mint, sage and coriander, based on phase distribution chromatography, coupled with gas chromatographic readout. A sample of the essential oil was dissolved in a polar solvent (nitromethane, DMFA, acetonitrile, DMSO), 10 ml of 1 N HCl, 50 ml distilled water and 15 ml NaCl solution were added, the

mixture was shaken in a separatory funnel with a 7:1 mixture of a n-hexane-diethyl ether. The aqueous layer was made alkaline with 1 N NaOH (to pH 8-10) and extracted with chloroform. The purified residue was gas-chromatographed on a Tsvet-106 apparatus equipped with a thermoionic detector. Sensitivity of this method is 0.1-0.2 mg/kg. References 14: 4 Russian, 10 Western.
[44-7813]

HEXATHIURAM-SEED TREATMENT AGENT

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 30-31

ANDREYEVA, YE. I., All-Union Scientific Research Institute of Chemical Plant Protective Agents

[Abstract] To control surface type wheat and rye smut, 80 percent hexathiuram solution is recommended. It is effective against various mildew fungi and root rot fungi of the sugar beet. It is a contact activity agent. It does not penetrate into the germinating seeds. The potency of hexathiuram is maintained for 30-35 days in the soil, in a wide range of pH values. It is detoxified by soil colloids and microflora; it is safe with respect to the surrounding medium. The seeds may be treated with hexathiuram up to one year before planting. Digested seeds should never be used for feeding. Hexathiuram is toxic and flammable; an air-dust mixture may be explosive. It should be stored in sealed containers. It retains its activity for up to two years. No references.
[44-7813]

UDC 632.954:633.34

THE USE OF RAMROD IN CHEMICAL WEEDING OF SOYBEANS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 35-37

VESELOVSKIY, I. V. and ZHEREBKO, V. M., Ukrainian Agriculture Academy

[Abstract] Ramrod (N-isopropyl-N-phenylchloracetamide) was evaluated in field tests as a chemical weeding agent on soybean fields. Ramrod, used in 6-10 kg per hectare doses, cleared the soybean beds from annual weeds throughout the vegetative period. The effectiveness of ramrod depended on the rainfall, decreasing with increased precipitation. The yield of the beans exceeded the control levels by 19.4-59.2 percent. Only the wild radishes, wild buckwheat and pigweeds were resistant to ramrod. References 8: 6 Russian, 2 Western.
[44-7813]

UDC 632.981.5

COMPATIBILITY OF BIOLOGICAL PREPARATIONS WITH INSECTICIDES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 54-56

ZAYATS, YU. V. and KISELEK, YE. V., Lazarev Parasitorium, All-Union Institute of Plant Protection

[Abstract] The complex systems of plant protection include combinations of biological preparations mixed with insecticides. In such systems, the toxic effects of the insecticides towards the microorganisms must be considered. A number of chemical agents was evaluated under laboratory conditions. It was shown that chlorophos, phozalon, sevin and dilor had practically no toxic effect on bacillus thuringiensis and beauveria bassiana for a period of 6 hrs. After 24 hrs, a ten-fold decrease of cells was observed. A mixture of 0.1 percent boverine with 0.05 percent technical chlorophos remained toxic towards the colorado beetle for 24 hours after the preparation. References 12: 5 Russian, 1 Hungarian, 6 Western.
[44-7813]

UDC 632.951:633.63

INSECTICIDES AGAINST SUGAR BEETS CUTWORM

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 22-26

MARKOV, F. I. and ISAKULOVA, D. I., Kirgiz Experimental-Selection Station for Sugar beets

[Abstract] The aim of this study was to determine the effectiveness of granular insecticides in controlling sugar beet cutworm, to test some new preparations and to determine the most practical schedule for the application of pesticides. It was shown that the best period for the application of insecticides is during the initial development of the grub. At that period the following agents were found to be effective: -isomer of HCCH, bazudin, valexon, phosphaman, chlorophos and dilor. Spring application was ineffective. Late application of bazudin and valexon followed by phosphaman and chlorophos were also effective. At the adult stage of development, only bazudin showed any effect. The granulated insecticides may be applied by covering the entire field, or by [illegible] row application, next to the plants. None of the agents used had any detrimental effects on the quality of the sugar beets; the yield, sugar level and the quality of juice were not affected. References: 10 Russian.
[44-7813]

COOPERATION AMONG THE SEV (SOVIET OF ECONOMIC ASSISTANCE) MEMBERS IN THE DEVELOPMENT OF MINERAL FERTILIZER INDUSTRY

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 7-10

SHARKOV, L. Z.

[Abstract] The Soviet of Economic Assistance coordinates the efforts of its members in the development of agriculture, in dissemination of technical progress and evaluation of the industrial achievements. An important role is played by the standing commission on chemical industry, and within it, by the working group on mineral fertilizers, which is concerned with the production of mineral fertilizers and with chemicalization of the agriculture. One of its recommendations was to increase the production of nitrogen and phosphorus fertilizers in all member countries of the SEV, and also an increase of potassium fertilizers in the USSR and GDR. The USSR favored the natural gas and crude petroleum as the starting materials for these products by agreeing to supply them to member countries. The production of nitrogen fertilizers world-wide increased by 4.1 fold during 1960-1975, while among the SEV nations it was increased 6.9 fold. Analogous increases held in the

production of phosphorus and potassium fertilizers. In addition to the increase in the quantity of production, its quality was also improved, the assortment enlarged and the storage and transportation capabilities expanded. The working group standardized quality control measures. Ambitious plans were made for the 1981-1985 period: widening of the crude resources, protection of the environment, and further development of more effective technological processes. No figures or references.
[44-7813]

UDC 63.54

THE SCIENCE GOALS IN THE AREA OF AGRICULTURE CHEMICALIZATION

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 3-7

VOL'FKOVICH, S. I., NIUIF

[Abstract] This is an abbreviated version of a presentation at a general session of the USSR Academy of Sciences. Chemicalization of agriculture is continuously increasing, the Soviet Union being the leader in production of mineral fertilizers since 1973. The production of chemical plant protecting agents and biologically active compounds has not developed as rapidly. The need for an increased production of fertilizers is based on increases in the acreage being covered, losses due to the washouts, a low degree of effective utilization by the plants, and competition by weeds. The storage of fertilizers creates another set of problems. One of the important tasks is to improve the granularity of mineral fertilizers, making them capable of withstanding transportation and storage without losses. In addition to the fertilizers, attention should be directed towards the maintenance of the soil, especially in year-around, greenhouse-like farming. Chemicalization is not a temporary phenomenon, it is a long-lasting, gradually intensified factor in the progress of agriculture. No figures or references.
[44-7813]

UDC 632.95:502.7

THE FUTURE OF THE PRODUCTION AND UTILIZATION OF PESTICIDES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 13-19

MEL'NIKOV, N. N., All-Union Scientific Research Institute of Chemical Plant Protective Agents

[Abstract] Pesticides include not only chemical agents used to control weeds and diseases of various plants, but also defoliants, growth regulators and dessicants. As the use of mineral fertilizers keeps increasing, more attention should be paid to measures protecting cultured plants. First, weeds must be destroyed, since they compete effectively for the nutrients in the soil, for water, etc. In this area, herbicides are very helpful. As the use of various chemicals increases, so does the contamination of the environment. It is stated, however, that pesticides are responsible for about 0.2 percent of the environmental pollution only, the principal contaminant being the combustion of fuel. Research in the area of pesticides concentrates on the activity of shorter duration, on agents less toxic to humans and those with faster degradation. A number of agents has been reviewed, stressing the need for the continuation of research to yield compounds without teratogenic, mutagenic or embryotoxic activity, compounds stable in storage and those with very special activity safe to humans. References 31: 11 Russian, 20 Western.
[44-7813]

UDC 632.951:631.563

TOXICITY OF INSECTICIDES USED AGAINST STORED GRAIN PESTS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian Vol 17 No 6, 1979 pp 19-21

LEVCHENKO, YE. A. and DIDENKO, L. N., All-Union Selection-Genetics Institute

[Abstract] Annual losses of grain are caused by a number of coleoptera pests. Contact toxicity of organophosphoric insecticides was determined under laboratory conditions. The most toxic agents were: tsianox, aktellik, valexon, baytex, diazinon and heterophos. Average toxicity was exhibited by: phozalon, etaphos, orten and dipterphos, while chlorophos was found to be nontoxic. The most resistant pests were sitophilus granarius, sitophilus orizae and tribolium castaneum herbst: orizaephilus surinamensis L. was less resistant; and tribolium madens charp was least resistant to the insecticides. Valexon and etaphos were effective as fumigating agents. Figure 1; references 6: 4 Russian, 1 Polish, 1 Western.
[44-7813]

UDC 632.95.025.8

THE EFFECT OF PHOSPHAMIDE AND CARBOPHOS ON CITRUS WHITEFLY ESTERASE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1980 pp 39-41

LEKVEYSHVILI, N. I., Candidate of Agricultural Sciences, Georgian Scientific Research Institute of Plant Protection

[Abstract] Phosphamide, carbophos, etaphos and cidial were used in orchards in Georgia to test their effectiveness against the citrus whitefly. It was found that citrus whitefly is not tolerant to phosphamide or carbophos. However, cross-tolerance was found for cidial and etaphos, not previously used against this pest. The esterase mechanism of tolerance of the citrus whitefly is determined primarily by a decrease in sensitivity of cholin esterase to the oxygen analogs of phosphamide and carbophos formed in the organism of the treated insects. This indicates the beginning of formation of resistance in individual populations of the pest. Resistance is currently increasing slowly; however, if the insecticides continue to be used for long periods of time, the resistance may increase sharply. References 7: 2 Russian, 5 Western.
[136-6508]

UDC 632.95.025

EFFECT OF STEREO ISOMERS OF THIOPHOSPHORORGANIC COMPOUNDS CONTAINING AMINO ACID GROUPS ON MITE ESTERASE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1980 pp 37-39

SUNDUKOV, O. V., Candidate of Biological Sciences, GOLOVKINA, L. S., MASTRYUKOVA, T. A., Doctor of Chemical Sciences, SHIPOV, A. E., Candidate of Chemical Sciences, ZHDANOVA, G. V., KABACHNIK, M. I., Academician, All-Union Institute of Plant Protection VASKHNIL, Institute of Heteroorganic Compounds, USSR Academy of Sciences

[Abstract] The stereo isomers of organophosphorus compounds have different levels of physiologic activity with respect to arthropod esterases. The present study was performed with stereo isomers of thio-and dithiophosphorates containing a fragment of the amino acid valine. The ordinary red spider mite and the Hawthorne mite were used, tested by immersion for 3 s in 20% alcohol solutions of the toxicants. The experiments were repeated three times with 50 to 60 mites in each version, dipped together with leaves on which they were clinging. The effect of the compounds on the esterase was determined by studying mite homogenates. Differences in the toxicity of S-enantiomers for the two mites studied were observed, and may have been caused by differences in the rate of metabolic hydrolysis in the organism of the animals. Figures 2; references 11: 7 Russian, 4 Western. [136-6508]

UDC 632.951:634.11

INFLUENCE OF INSECTICIDES ON DROPPING OF APPLES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 1, 1980 pp 34-36

LAGUNOV, A. G., Candidate of Biological Sciences, Volgograd Agricultural Institute

[Abstract] Various preparations are used to control the lesser apple worm, including sevin, which acts as a growth regulator and causes some of the fruit to fall. It can therefore only be used a month after blossoming. Experiments were performed in Volgograd Oblast with both summer and autumn apples to determine safe conditions for application of sevin. Sevin was found to be insignificantly more effective in causing dropping of very young fruit than other pesticides tested (rogor and fozalon). References: 11 Russian. [136-6508]

PETROLEUM PROCESSING TECHNOLOGY

UDC 665.644.4(083.9)/66.013.5/66-984

UNIT L-35-11/300ND FOR CATALYST REFORMING AT LOW PRESSURE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 1, 1980 pp 3-4

ASPEL', N. B., SALOV, N. P., and YZDENSKIY, V. B., Lengiproneftekhim

[Abstract] The title unit, which used a polymetallic catalyst, was built at the All-Union Scientific Research Institute for Petrochemistry. With regard to the mass balance, the new unit, as compared to a conventional unit, is distinguished by a decrease in dry gas and an increase in the hydrogen content of the product. The operating conditions for the two units are very similar in both the hydrogenation refining and the reforming blocks; however, for the latter, the pressure in the new unit is approximately half that of the conventional unit. The principal advantages are as follows: the feedstock mixtures for the hydrogenation refining and reforming blocks are heated in individual tubular furnaces; the steam pipe and pipes for the stabilization of the catalyst are heated by a heat conductor via a heat exchanges reboiler; the de-ethanization of the unstable catalysate is carried out in a two-column (adsorber-desorber) system. Tables 3.
[138-12027]

UDC 665.644.4.001.6/66.097.3/665.73/621/43/019.862

CATALYTIC REFORMING OF THE GASOLINE FRACTION (85-180°C) AT LOW PRESSURE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 1, 1980 pp 8-10

FEDOROV, A. P., MASLYANSKIY, G. N., SHKURATOVA, YE. A. and ZHARKOV, B. B., Krasnodarsky Branch of the VNIINeftekhim (TN: All-Union Scientific Studies Institute of Petrochemistry)

[Abstract] New bi- and poly-metallic catalysts for reforming have been prepared which are characterized by a high stability and which retain their selectivity at lower pressures. Results are presented for the catalytic reforming of a wide gasoline fraction (85-180°C) on one such catalyst (KR-106) at 15 atm (as compared to the usual 30 atm) and at temperatures of 470°, 490°, 500°, and 510°C. The lower pressure also permitted operating at a lower temperature. A high degree of specificity was retained for the formation of aromatic components through the dehydrocyclization of the paraffins. With increasing temperature, the following changes were noted: the overall gasoline yield decreased (from 93.1 to 81.1%), the C-5+ increased (from 1.27 to 2.42%), the hydrogen content of the cyclization gas decreased (from 90.6 to 78%), the methane content increased (from 3.5 to 6.5%), the paraffin and naphthene components decreased (from 46.6 to 20.5% and from 5.4 to 2.6% respectively), the aromatic fraction increased (from 47 to 75.9%) as well as the relative yield due to the cyclization of paraffins (44.5 to 59.2%) and the octane number increased (from 73.0 to 89.7). Tables 4; figures 2. [138-12027]

UDC 665.642.001.6/66.123.23

EXPERIMENTAL RUN OF THE 35-6 UNIT OF THE NOVOKUYBYSHEVSKY NPZ (TN: expansion uncertain: oil-producing zone?) UNDER A SEVERE REGIME

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 1, 1980 pp 18-19

KARPEYEV, V. M., ZABOTIN, L. I., LEVINTER, M. YE., SEMENOV, V. F., VASIL'YEVA, M. I. and TEREKHIN, YE. M., PO "Kuybyshevnefteorgsintez"

[Abstract] The title unit was operated under a more severe regime than had been reported previously in order to determine the yield and product composition under these conditions. A second reason was to obtain information on the individual steps in the reforming towards the end of the reaction cycle (after 400 days of operation). With the increase in severity, the average temperature of the process increased from 474° to 480°C; the pressure at the compressor intakes decreased from 15 to 12 atm; the H_2 content

of the cyclization gas decreased from 82.4 to 75%; the yield of stable catalysate decreased from 90 to 85.5%; n- and iso-paraffins decreased from 18 to 12.3% and from 28.8 to 25.4% respectively while the cyclopentanes and cyclohexanes decreased from 2.7 to 1.8% and from 0.5 to 0.4% respectively; and the aromatic and the xylol + ethylbenzene fractions increased from 50.0 to 60.1% and from 28.1 to 35.5% respectively. Tables 1.
[138-12027]

UDC 665.637.88.013/66.023.23/658.511.3

EVALUATION OF THE OPERATION OF A COLUMN-TYPE REACTOR OF THE NK NPZ [NOVOKUYBYSHEVSKY OIL REFINERY] BITUMEN UNIT

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 12, 1980 pp 11-13 manuscript received 20 Feb 79

FOMIN, N. I. and LAVRENT'YEV, V. V., PO "Kuybyshevnefteorgsintez"

[Abstract] In order to improve the characteristics of processed bitumen, the following sections of the bitumen unit were modified: two oxidizer columns were assembled, a compressor and pump apparatus were changed, and the condensation system for the oxidizing gases was expanded. A block diagram of the new system is shown. Operation of the oxidizing column is easy to regulate and is not as difficult to service as the cubic assembly. The introduction of the new column results in an increase in the amount of bitumen which can be processed and an improvement in its characteristics. Data on physical properties of samples oxidized in both the cubic and the columnar assemblies are given. An increase in the oxidation temperature in the column to 270°C permits a reduction in the oxygen content of the oxidizing gases thereby allowing a lower air flow. A table shows the correlations among productivity, oxidation temperature, air flow, oxygen content in the oxidizing gas, and softening temperature of the product. Figures 1; tables 2.
[140-12027]

UDC 665.637.88.001.6/66.094.373/546.72

EXPERIMENTAL-COMMERCIAL OXIDATION OF BOTTOMS STOCK IN THE PRESENCE OF IRON CHLORIDE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 12, 1980 pp 8-11 manuscript received 24 Apr 79

SHABALINA, L. N., GUN, R. B., SAMOKHVALOV, A. I., PANKOV, N. P. and FINASHIN, V. N., Moscow NPZ [Oil Refinery]

[Abstract] Studies carried out for the last ten years on the application of traces of $FeCl_3$ during the oxidation of bitumens in the commercial production of roofing material have shown the high durability of catalytically oxidized bitumen. Four regimes, two with 0.1% $FeCl_3$ and two without catalyst, were evaluated. The parameters which were varied include rate of introduction of asphalt (30-40 m^3/hr), temperatures at different points in the distillation column, and temperature in the assembly (220-240°C). Five samples of the oxidized bitumens and one of the original material were analyzed for physical properties and chemical composition. The properties of all the oxidized bitumens fell within virtually the same range but those of the original material were distinctly different. Nonetheless, the asphalt paving made of the catalytically oxidized bitumen, above a temperature of 0°C had a 16-28% greater resistance to compression and a 14-22% lower deformation than that made from bitumen to which $FeCl_3$ had not been added during the oxidation. The catalytically oxidized bitumen was also more stable at higher temperatures; however, at the lower temperatures it was somewhat more rigid than the non-catalytically oxidized bitumen. Figures 2; tables 2.
[140-12027]

UDC 665.63.013/620.197.3

STUDY OF THE OPTIMUM INTRODUCTION OF CORROSION-PREVENTION REAGENTS INTO SECTIONS OF THE LK-6U PETROLEUM PRIMARY DISTILLATION UNIT OF THE MOSCOW NPZ(TN: petroleum-producing zone?)

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 12, 1980 pp 5-8 manuscript received 16 Mar 79

GERINA, L. S., TOMIN, V. P., PUSHKAREVA, G. A. and FOKIN, V. A., Moscow NPZ [Oil Refinery]

[Abstract] One of the principal methods for preventing corrosion is the addition of salts or alkalis to oils, in order to convert the calcium and magnesium chlorides into the difficulty soluble hydroxides or carbonates, plus sodium chloride which does not hydrolyze during the initial distillation of the oil. The original crude had a $CaCl_2$:$MgCl_2$:NaCl ratio equal to 36:16:51; for the desalted, dewatered crude, that same ratio is 77:23:0. A 4:1 salt:alkali solution having a total solids concentration of 22.3 g/ton was added to the desalted oil in doses of 10, 20, 30, and 40 g/ton. Plots of corrosion indicators such as H_2S, pH, Fe, and others as a function of the amount of salt-alkali solution added show that the optimum dose is 25-30 g/ton desalted crude. A 3:1 salt-alkali solution was also evaluated but the corrosion protection was inferior to that of the 4:1 solution. Figures 2; tables 1.
[140-12027]

UDC 665.63.013/66.023/23/658.511.3

EVALUATION OF PERFORMANCE ENHANCEMENT OF TOPPING COLUMNS IN UNITS FOR THE PRIMARY PROCESSING OF OIL FROM THE NK NPZ [Novokuybyshev Oil Refinery]

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 12, 1980 pp 3-4 manuscript received 16 Apr 79

UZUNKOYAN, P. N., KARPEYEV, V. M., SHEVELEV, YU. V. and VAKHMYANIN, V. I., PO "Kuybyshevnefteorgsintez"

[Abstract] The operating indicators for the units are to a greater or lesser extent a function of the efficiencies of the component parts. Laboratory studies were conducted to define these relationships using 11 units of different sizes and capacities operating at different temperatures and pressures. It was concluded that in all the units but one, the lower level of the initial heating of the oil and also the topping columns do not receive

sufficient heat. As a result, the entire topping column for all but one of the units operates with a minimum efficiency which is unrelated to the amount of heat or number of theoretical plates in the column. A 25-30% increase in the flow of oil to the mouth of the column is necessary to increase the temperature of the base of the topping column by 30-40°C. The presence of the circulating oil flow complicates the design for the unit; nonetheless, the system has the advantage of providing a separate coil in the heater. Otherwise, an artificially high pressure would be generated in the transfer piping for the heated coil. Circulation of larger amounts of oil requires an additional expenditure of energy. Tables 1.
[140-12027]

INFLUENCE OF HYDROCARBON PORTION OF SURFACTANTS ON THEIR ORIENTATION ON METALS

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 43-45

DEMCHENKO, V. S., MARKOV, A. A. and BELYAKOVA, V. I., Leningrad Institute of Construction Engineering

[Abstract] A study is made of surfactant corrosion inhibitors. The strength of the bond between the additive molecule and metal depends to a great extent on the nature and total number of atoms in each molecule directly bonded to the surface of the metal. Earlier works have assumed that each molecule of the additive in the boundary layer of a film is bonded to the metal only through one active atom, such as sulfur, phosphorus or nitrogen, and that the hydrocarbon portion of the molecule is located in space perpendicular to the surface of the metal. This concept is based on old studies which showed the presence of a saturated monomolecular layer of vertically oriented molecules of fatty acids at the interface with water. However, a metal surface is quite different from a water surface, and surfactants can interact with metal surfaces through the carbon molecules, and also through the free electrons of various organic groups. In the development of corrosion-resistant additives, one must carefully consider the properties and position of the functional groups, as well as the properties and structure of the carbon portion of the molecule to assure firm bonding with the metal surface. References: 11 Russian.
[123-6508]

HIGH-INDEX MIXTURES OF ESTERS AND DEPARAFFINATED RAFFINATES

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 42-43

VARFOLOMEYEV, D. F., MUSAYEV, Z. Z., KUKOVITSKIY, M. M. and BUKKULOV, A. Z., Ufa Refinery imeni The 22nd CPSU Congress

[Abstract] An earlier article studied the influence of the structure of the molecules of components mixed on the viscosity index of mixtures containing a mineral component and an ester. This article presents materials showing the nature of the change in viscosity index of these mixtures with a change in the content of the ester. In all cases, the actual index of viscosity of the mixtures of deparaffinated raffinates and esters was higher than the arithmetic mean value of the components. The maximum value of index of viscosity corresponds to a content of 60-70% ester. The increase in index of viscosity of mixtures of deparaffinated raffinates and esters is proportional to a ratio of coefficients of viscosity depression of $k_{50}:k_{100}$. Figures 2; references: 4 Russian.
[123-6508]

UDC 66.094.382.004.4

EFFECTIVENESS OF ANTIOXIDANT ADDITIVES IN UNDERGROUND STORAGE OF FUELS

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 26-28

AZEV, V. S. and KUZNETSOVA, L. N.

[Abstract] The influence of sodium chloride on the effectiveness of antioxidant additives intended for stabilization of fuel stored underground was studied by oxidation of chemically unstable fractions of gasoline produced by cracking at 130-180 C. Oxidation was performed at 100 and 110 C for 6 hours without salt and with 8 g of NaCl per 100 ml fraction. The studies demonstrated the possibility of effective chemical stabilization of fuels containing unstable thermal cracking components for underground storage in salt caverns using PODPA (p-oxydiphenylamine), ionol and FCH-16 (composition not given). Preference should be given to PODPA. References: 6 Russian.
[123-6508]

PRODUCTION OF A HIGH-SULFUR ADDITIVE FOR LUBRICANTS

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 15-16

UTKIN, V. A. and SEROV, V. A., All-Union Scientific Research Institute for Planning and Design of Petrochemical Processes

[Abstract] The reaction of n-butylchloride with elementary sulfur in the presence of ethylene diamine under moderate conditions (30-40 C) was selected for the synthesis of high-sulfur lubricant additives. The product of the reaction is a mixture of disulfides and trisulfides. Reaction conditions were sought to maximize the trisulfide content. Conditions were found under which the trisulfide content reaches 30%, the sulfur content exceeding 50%. The elemental sulfur also remains stable, greatly increasing the antiscratching properties of the additive. References 5: 2 Russian, 3 Western.
[123-6508]

CARBON ADSORPTION RECOVERY OF GASOLINE VAPOR

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 13-15

KISAROV, V. M., BEGUN, L. B., KUDAKOVA, L. M. and SUBBOTIN, A. I., Dzerzhinsk Affiliate of the Scientific Research Institute for Purification of Gases

[Abstract] A study was made of the adsorption of vapors of type BR-1 gasoline on industrial activated carbon type AR-3 and SKT in the laboratory. The variation of saturated vapor pressure with temperature was measured in the 290°-370°K temperature interval. The dynamics of adsorption was studied on the basis of increase in the concentration of the components of gasoline beyond the layer of adsorbent with time. The carrier gas used was air. A table shows the time of protective action as a function of adsorbent layer thickness and the distribution of adsorbate over the length of the layer. The best results were achieved by using two layers, one of each of the two types of carbon tested. Characteristics of desorption and drying of the carbon after saturation are also studied. Figures 3; references: 5 Russian.
[123-6508]

CHANGE IN THE QUALITY OF PARAFFIN WITH STAGED CARBAMIDE FEED

KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 2, 1980 pp 10-12

DORODNOVA, V. S., MARMYNENKO, A. G., MARTIROSOV, R. A. and PEREVERZEV, A. N., Groznyy Petroleum Scientific Research Institute

[Abstract] In order to achieve the maximum paraffin yield from carbamide dewaxing of petroleum, the raw material must be treated three times or more with the carbamide. However, published works to date have presented no information on the properties of the waxes extracted in each stage of carbamide treatment or the variation in these properties as a function of the quantity of carbamide input per unit time. A series of experiments involving extraction of paraffins with crystalline carbamide input in portions was performed to answer these questions. The results are presented in tabular form. The first portion of carbamide picks up the hydrocarbons of highest molecular weight, and each subsequent stage extracts lighter and lighter waxes. Figures 4; references: 5 Russian.
[123-6508]

UDC 665.6.66.013.5

STATUS OF PLANNING AND PROSPECTS FOR CONSTRUCTION OF THE NEW LK-9M COMBINED INSTALLATIONS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 3-5

VASIL'EV, A. V., Lengiproneftekhim

[Abstract] The LK-9M oil refinery installation is intended to work with a mixture of Western Siberian petroleum. The plant includes the following sections: primary distilllation of petroleum with electric desalination; preliminary hydropurification of gasoline and secondary fractional distillation; catalytic reforming of gasoline; production of RT fuel component; hydropurification of diesel fuel; gas fractionation; isomerization of the pentane-hexane fraction. Each of these sections is briefl described. The LK-9M is intended to replace the LK-6u refinery equipment, which has served as the basis of its development.
[121-6508]

UDC 665.6
66.013
665.63.013.004.69

MODERNIZATION OF ONE SECTION AT OF THE LK-6u INSTALLATION IN ORDER TO INCREASE ITS ECONOMIC INDICES

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 5-7

LOZIN, V. V. and MANOVYAN, A. K., Groznii

[Abstract] The plan for the LK-6u combined installation called for rigid coupling of all processes, without intermediate cooling of process streams. However, the installation was first started with reservoirs connected between the processes, requiring cooling and reheating of the streams. Also, intermediate heating and cooling installations were installed to remove water from the process stream to avoid poisoning of catalysts. Three systems have been suggested to eliminate the need to feed water vapor into the stripping section of the distillation column in order to avoid this problem. It was recommended that heat be fed into the bottom of the stripping columns by reboilers heated by the stream of distillate from the AT section. A system has also been developed for plants where large tonnage production of liquid paraffins is planned completely eliminating the use of steam in all fractional distillation processes. The system calls for separate fractional distillation of the vapor and liquid portions of the petroleum after initial evaporation, further distillation of the heavy reflux from the atmospheric pressure column in a vacuum fractionation column and complete elimination of water vapor from the atmospheric pressure distillation process. Finally, a new more efficient profile has been developed for the transfer line, reducing its length to less than half the previous length.
[121-6508]

UDC 665.633.8
66.023.23.001.24(083.13)
681.3

SOME RULES APPLYING TO THE PROCESS OF FRACTIONAL DISTILLATION OF STRAIGHT-RUN GASOLINE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 7-11

BOCHAVER, K. Z., ROMANOVA, YE. G. and SHOKINA, L. I., All-Union Scientific and Production Institute for the Petroleum Industry

[Abstract] The authors performed a mathematical study of the process of fractionation of straight-run gasoline to produce nearer fractions. The data from this mathematical study and experimental data indicate a number of rules which can be used to simplify the design of secondary fractional distillation columns while assuring the necessary accuracy of calculation. The method is designed for solution of the problems of planning using medium and small computers, and also to be used in a system for automated planning and composition of more complex models. Figures 3.
[121-6508]

UDC 665.637.6
665.662.36.001.76

IMPROVEMENT OF THE PROCESS OF SELECTIVE PURIFICATION OF OILS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 18-20

SHEVTSOV, A. M., PETROV, V. N. and MISHCHENKO, A. F., Novokuybyshev Oil Refinery

[Abstract] A method of extraction has been developed which allows improvement in the accuracy of separation by a factor of 1.5 or more. The technological diagram is shown in an illustration. In contrast to the ordinary system, the lower portion of column K-1 receives a phenyl-free extract in place of the phenyl water, and separation of the secondary refined phenyl water solution is performed in a separate apparatus. Industrial testing of the method was performed primarily on deasphaltizate from petroleums arriving at the refinery between 1974 and 1978. Test data are presented in tables. Proper selection of the flow rate of phenyl-free extract into K-1 and phenyl water into E-8 assures optimal purification conditions.
[121-6508]

UDC 665.637.6:621.892.096/097
665.7.038.64.001.5
678.7

COMPARATIVE STUDY OF VISCOSITY ADDITIVES FOR MOTOR OILS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 20-22

VIPPER, A. B., NEPOGOD'EV, A. V., KOZHEKIN, A. V., KONAKOVA, S. A. and YELAGIN, D. I.

[Abstract] A study was made of viscosity additives of various compositions for motor oils. It was found that additives based on styrene have the greatest thickening capacity, those based on polyisobutylene have the lowest. The viscosity of the oil was also tested as a function of shear speed gradient. None of the additives was found to be clearly superior to the others in all respects. However, polymer additives based on polymethacrylate shows superior characteristics under the conditions normally encountered in operating engines.
[121-6508]

UDC 661.715.25
661.716.1.4.5
665.632

EXPERIENCE IN SEPARATION OF COMMERCIAL PENTANES FROM THE BUTANE-PENTANE FRACTION OF HYDROPURIFIED ORENBURG CONDENSATE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 28-30

ASYLUGZHIN, A. SH., BELYAEVA, Z. G. and TOMEYEV, R. T., Salavat Petrochemical Combine

[Abstract] The Salavat Petrochemical Combine produces isopentane and n-pentane fractions from isopentane-pentane fractions containing not over 0.003% sulfur compounds by mass. Due to a shortage of low-sulfur pentane raw materials, the combine has begun to use Orenburg gas condensate, the butane-pentane fraction. The raw material is fed into a fractional distillation column at the 37th plate. The excess isobutane-butane fraction is removed for processing in the butane section of the installation. Diagrams are presented of the pentane section and the section for production of n-pentane and isopentane. A chromatograph is connected in the stream for quality control of the product produced.
[121-6508]

UDC 661.715.25
66.095.217
661.183.6

SPECIFICS OF THE TRANSFORMATION OF 1-PENTANE ON THE LANTHANUM FORM OF TYPE Y ZEOLITE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 30-32

DOROGOCHINSKIY, A. Z., KARAKASHEV, Z. G. and ZHAVORONKOV, M. N., Groznensk Petroleum Institute

[Abstract] A report is presented on a study of the transformation of 1-pentane on the lanthanum form of type Y zeolite. The catalyst which was studied was obtained by introduction of La^{3+} cations to the initial sodium form of zeolite by ion exchange. The studies were performed in the 300-450 C temperature interval at space velocities of 8-24 hr^{-1}. Experiments varied in length from 5 to 50 minutes. The following main conversions of pentane occur in this range of conditions: structural isomerization forming 2-pentene; skeletal isomerization forming isopentene; redistribution of hydrogen forming saturated hydrocarbons, cracking and disproprotionation forming C_2-C_6 hydrocarbons, formation of polymers, including some chemosorbed on the surface of the catalyst, and coke. As the space velocity increases, the overall activity of the catalyst, particularly in the reactions of skeletal isomerization, formation of chemosorbed polymers and coke and gas formation, decreases. Figures 3.
[121-6508]

UDC 665.65.001.6(571.53)
66.013
65.016.4
001.62

THE EXPERIMENTAL BASE OF THE RESEARCH CENTER OF "ANGARSKNEFTEORGSINTEZ" PRODUCTION UNION

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 2, 1980 pp 41-42

KHUDYAKOV, A. YE., KLYUZHINA, YE. G., RUSANOV, N. P. and EPPEL', S. A., Angarsnefteorgsintez Production Union

[Abstract] The union was created as a large research center and experimental laboratory. In 1967, a pilot plant was set up at the research center. It now includes a central laboratory; four technological shops (experimental installations, polyformaldehyde, hydrocracking and synthetic oil installations); three supplementary shops (mechanical repair shop, electrical parts shop and experimental shop); and a planning-design division. Each of the shops and divisions is described. No important developments are put into production until they have been tested in the pilot-scale plants of the union.
[121-6508]

UDC 665.664.592.2(575.41/574.12)

A COMPARATIVE STUDY OF HIGH-MOLECULAR NORMAL PARAFFINS OF PETROLEUM AND OZOCERITE

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR--SERIYA FIZIKO-TEKHNICHESKIKH KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 6, 1979 submitted 2 Apr 79 signed to press 18 Jan 80 pp 23-26

TALALYAYEV, YE. I., SERGIYENKO, S. R., AYDOGDYYEV, A. and CHELPANOVA, M. P., Turkmen SSR Academy of Sciences Institute of Chemistry

[Abstract] A comparison of the composition and concentration distribution of high molecular paraffin hydrocarbons from Cheleken ozocerite with residues of Kotur-Tepe, Oval-Towal and Burun petroleums showed that all samples studied contain homologs of normal paraffin hydrocarbons from C_{39}-C_{55}; the highest concentrations contained homologs with an even content of C-atoms--C_{44}, C_{46}. Kotur-Tepe residues closely resembled ozocerite in concentration

distribution of high molecular individual paraffin hydrocarbons. Both were superior to Burun petroleum in this respect while Oval-Toval petroleum was rated between these two. References: 2 Russian; figures 2.
[133-2791]

UDC 665.664.592.2(575.41/574.12)

COMPOSITION AND PROPERTIES OF NORMAL PARAFFINS ISOLATED FROM PETROLEUMS OF THE WESTERN TURKMENISTAN DEPOSIT

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR--SERIYA FIZIKO-TEKHNICHESKIKH KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 6, 1979 submitted 2 Apr 79 signed to press 18 Jan 80 pp 27-32

TALALYAYEV, YE. I., SERGIYENKO, S. R., OVEZOV, A. A. and AYDOGDYYEV, A., Turkmen SSR Academy of Sciences Institute of Chemistry

[Abstract] A study of the composition and structure of hydrocarbons which form crystalline complexes with carbamide, isolated from the saturated part of 50° fractions boiling out within the limits of 200-500°C, of Eastern Kotur-Tepe, Oval-Toval and Burun deposits indicated that the Kotur-Tepe petroleum contained the highest (71-97%) level of unbranched forms of paraffins with Oval-Toval being second (66-88%) and Burun petroleum (41-57%) third. References: 2 Russian; figures 2.
[133-2791]

UDC 665.592:547.21

STRUCTURE OF HYDROCARBONS OF THE MIDDLE FRACTION OF OVAL-TOVAL CRUDE

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR--SERIYA FIZIKO-TEKHNICHESKIKH KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 6, 1979 submitted 14 Jun 79 signed to press 18 Jan 80 pp 33-36

KARAYEV, YA. and ERNEPESOV, KH. N., Turkmen SSR Academy of Sciences Institute of Chemistry

[Abstract] A detailed chromotographic and spectrophotometric study of the composition and structure of the 250°-300° fraction of Oval-Toval crude showed that it contains transdecaline, 2-methyl-trans, trans, and 3-methylcis,- transdecalines in addition to previously known data about this fraction. References: 7 Russian; figure 1.
[133-2791]

UDC 665.592(575.4+574.12)

INDIVIDUAL HYDROCARBON COMPOSITION OF LOW-BOILING FRACTIONS OF DAULETABAD, EASTERN DAULETABAD AND DONMEZ CONDENSATES

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR--SERIYA FIZIKO-TEKHNICHESKIKH KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 6, 1979 submitted 2 Apr 79 signed to press 18 Jan 80 pp 37-41

KUL'DZHAYEV, B. A. and SERGIYENKO, S. R., Turkmen SSR Academy of Sciences Institute of Chemistry

[Abstract] A study of the individual composition of hydrocarbons of condensates of Dauletabad, Eastern Dauletabad and Donmez deposits of the light part of these condensates--boiling at up to 150° showed the basic part of the cyclic hydrocarbons is concentrated in the light fraction. In the lightest fractions (start to boil at 95°) cyclic hydrocarbons constituted 35-50% including benzene 21-33%, cyclohexane 5-7% and methyl cyclohexane 4-8.5%. As the boiling limits of fractions increased, the hydrocarbons level decreased and the paraffin content increased. References: 3 Russian. [133-2791]

UDC 542.97:547.21

SYNTHESIS OF ALIPHATIC HYDROCARBONS FROM CO AND H_2 OVER Rh-COMPLEX CATALYSTS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 2, Feb 80 pp 335-338 manuscript received 6 Dec 78

LAPIDUS, A. L. and SAVEL'YEV, M. M., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Catalytic properties of the system Rh_nL_m-$AlBr_3$-Al (transition metal complex-Lewis acid-reducing agent) in the synthesis of hydrocarbons from CO and H_2 were investigated. Individual components and their binary combinations showed either none or very weak catalytic activity in this reaction. The activity and selectivity of this system depend on the type of Rhodium complex used and the ratio of the components and reaction temperature; the optimal system consists of the following components: $Rh_4(CO)_{12}$, $[Rh(CO)_2Cl]_2$, $Na_2[RRh_{12}(CO)_{30}]$ and $(Ph_3P)_3RhCl$, with the Al:$AlBr_3$ ratio of 0.2-0.4 and the Rh:$AlBr_3$ ratio of 1:60 to 1:300. Conversion of

CO increased from 5 percent to 89 percent as the ratio of $CO:H_2$ in the reaction mixture decreased from 3 to 0.25. Removal of water from the reaction zone favored formation of longer chain hydrocarbons (C2 -C4). Figures 2; references 15: 1 Russian, 14 Western.
[127-7813]

UDC 678.06:63(575.2)

POLYMERIC MATERIALS IN THE AGRICULTURE OF THE KIRGIZ SSR

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 12-13

KHALMURZIN, K., chief of the section of agriculture of the Gosplan, KirgizSSR

[Abstract] Figures are cited to exemplify the accomplishments in Soviet agriculture requested by the plenums of the CC CPSU at the 24th and 25th Party Congresses. Kirgizia contributed its share in these accomplishments. In 1978 the republic produced over 1500 thousand tons of grain. Plastics have been exploited to assist agricultural production; polyethenylene plastic use in the Ninth Five-Year Plan amounted to 340 t, in 1977 to 616 t, in 1978 to 644 and in 1979 approximately 900 t was expected to be used. The plastics have been used as plastic shelter coverings for early vegetables, tobacco, seeds, hay, silage, fodders, storage and animal housing. Plastic sheets (from the All-Union Scientific Production Combine "Soyuzvodaftomatika") have been employed for covering mulched soil. Plastic piping has been investigated for use in soil reclamation and for irrigation (under the soil and spraying). Plastics are being studied as storage vessels for water, and as water-proof shields. Uses of various forms of plastics, acreage committed to such uses, type of crops, and profitability are tabulated. No references.
[87-8586]

UDC 678.5.004.15(474.3)

USE OF POLYMERIC MATERIALS IN THE AGRICULTURE OF LATVIA

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 13-15

BELOKUROV, P. N., deputy chairman of Gosplan, Latvian SSR

[Abstract] The Latvian SSR is cited as an important supplier of meat and dairy products. Development of the republic's farm output involves production of high quality fodders, hay and silage. Polyethylene plastics (400-450 t per year) are being used in the Lat SSR to protect fodders from climatic damage. Polystyrols (pipets, gloves) are being used in artificial insemination and veterinary gynecology, and veterinary health care. The VNII vodpolimer [All-Union Scientific Research Institute of Polymers for Water Needs?] notes the present need to replace ceramic pipes with plastic tubing for drainage; the labor expended for ceramic drainage piping is difficult and replacement by plastics would have technological, economic and social advantages. Use of polymeric materials for reclamation and water-supply construction will have similar advantages. Plastics have been successfully used for irrigated (10% of existing systems) for 7-8 years. The "Sigulda" experimental farm, the "Bulduri" sovkhoz-secondary training school, the "Brunava" sovkhoz and the Orgsk experimental station are cited as having used plastic piping for irrigation. The Latvian SciRes Institute of Agriculture and Agricultural Economics has worked out use of transparent plastic protective coverings for vegetables; these protectants have been produced by the "Latgiprosel'stroy." Plastics are being used in hot houses for seeds, protective sheets and greenhouses. Plastics are being used in construction of farm buildings. A Livanskiy experimental home-construction combine has a projected capacity to construct 2000 single-room houses a year; use of plastics in such construction will be helpful. The Institute of Mechanics of Polymers of the Latvian SSR Academy of Sciences in association with Kalntsiemskiy Combine of Construction Materials and the Olaynenskiy Plant for Processing Plastics are pursuing efforts to improve the quality and decrease the bulkiness of plastic parts, especially the contribution of fillers to reliability and effectiveness of plastic materials. Polymeric materials are being used in repair parts for tractors, autos, farm machines and animal housing. The LSSR State Committee on Material-Technical Provision to Agriculture has had--for over 10 years--eight sections involved with preparation of items from polymeric materials.
[87-8586]

UDC 678.06:63(478.9)

USE OF POLYMERIC MATERIALS IN THE AGRICULTURE OF THE MOLDAVIAN SSR

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 15-16

USTIYAN, I. G., Moldavian SSR Gosplan chairman

[Abstract] Moldavia is cited as an important producer of grapes, fruits, vegetables and tobacco. This production is effectively improved by chemization of agriculture including introduction of plastics, synthetic resins and items made from them. Data are tabulated on the republic's irrigation system, its cost, types of piping (asbestos cement and polyethylene) and kinds of watering employed; the economics achieved are noted. The Section on Droplet Irrigation of the All-Union SciRes Institute of Mechanization and Technology of Irrigation, in association with the Institute of Biochemistry and Physiology and Plants, MolSSR Academy of Sciences, the NPO "Kodru" and "Vierul", the Moldavian SciRes Institute of Irrigation Agriculture and Vegetable Farming have worked out scientific recommendations for design, construction and use of a droplet irrigation system. Tubing for such a system uses polymeric materials. The Kishinev Combine of Chemical Preparations of the MolSSR Ministry of Local Industry has increased its output of polymers from 4 t in 1975 to 536 t in 1978 (1100 t are projected for 1979). Plastics are to be used as protectants in vegetable growing, and in year-round greenhouses (e.g., for melons and squash). Construction materials have recourse to plastic parts. Plastic containers are used for packaging, shipping and storage. Plastics are being adapted for soil mulching; B-118 plastic sheet, 0.2-0.3 mm thick, 90-100 cm wide is being used to cover the soil between plant rows to control weeds. Polymeric materials production in the republic increased, in 1975-1978, by a factor of 4.3. Acceleration of the transition of the economy to the new technology will be assisted by the plastics industry. References: 2 Russian.
[87-8586]

UDC 678.06-278:63

EFFECTIVENESS OF USE OF GAS-SELECTIVE POLYMERIC MEMBRANES IN AGRICULTURE

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 18-19

GUL', V. YE., BALAVINTSEVA, YE. K. and GENEL', S. V.

[Abstract] Certain polymers, e.g., polyorganosiloxanes, are known to have different rates of permeability for different vapors and gases (Volkov, 1979, and others). This makes it possible to sustain, in a closed space, with a membrane of such material, an atmosphere of a given composition. The present work is an attempt to find relationships between the properties which define the polymer structure, the time for establishment of a stationary regimen and the composition of the gas phase in a closed space. In this closed space there is, under real conditions, a source of renewal of the components of the gaseous medium. When fruit, vegetables and potatoes are placed in the closed space, biochemical respiration occurs, expressed by the formula $C_6H_{12}O_6 + CO_2 = 6CO_2 + 6H_2O + 674$ kcal. The CO_2 and H_2O build up as long as equilibrium is not reached or if they are not removed by a gas-selective membrane. In the present work, the gas-selective device is a container, lined inside with a polyethylene insert, into which are placed products to be stored. The container has an orifice through which the starting, unmodified air enters. From the orifice, inside the container, goes a tube, with a sidearm, covered with the gas-selective membrane, to control the biochemical reaction in the products being stored. These products are the source of the gaseous substances. Gas exchange occurs in two stages, an immediate stage of change of gas composition and a stationary phase with no change of composition. Using mathematical description of the processes which go on it is shown that such a container can provide optimum composition of gases--by using an appropriate membrane substance and adjusting its physical properties to fit the products. The container can be used for storage of fresh agricultural products. References: 3 Russian.
[87-8586]

UDC 678.5.004

POLYMERIC MATERIALS POTENTIALLY USEFUL FOR CONSTRUCTION OF CULTIVATION EQUIPMENT

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 22-23

SYTNIK, V. I.

[Abstract] Using Soviet and foreign experience, the "Stroyplastik" experimental construction-design and technological bureau is currently developing i) glass fiber-reinforced polyethylene and polyvinylchloride plastics, ii) convexo-convex casings of transparent polyester plastic glass, and iii) sheets of hard, transparent polyvinylchloride. Use of (i) in protecting growing crops requires lasting strength and thermal properties. The second, (ii), group of plastics is finding use in greenhouses where they eliminate the disadvantages of metals. Properties of (ii) are discussed. The third, (iii), group, used abroad for some time, is finding some interest in the USSR. Its exploitation is hindered, at present, by the lack of formulas, in the USSR, for transparent hard polyvinylchloride materials which could meet environmental conditions and demands of year-round use. No references. [87-8586]

UDC 678.5-416:678.019.32

CHANGE IN PROPERTIES OF POLYMER PLASTICS IN THE PROCESS OF EXPLOITATION IN SPRING GREENHOUSES

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 26-27

BRYZGALOV, V. A. and OSIPOVA, G. S.

[Abstract] Polyethylene plastic is the basic polymer used to cover greenhouses; it has the disadvantage of low resistance to the atmosphere and is subject to breakdown after 4-5 months when used to cover metal frames. Attempts to improve its properties or to find a substitute (e.g., polyvinylchloride) have been underway. New forms are being tested at the Leningrad Order of Labor's Red Banner Agricultural Institute. These Soviet made forms are designated PES (polyethylene stabilized), PESG (polyethylene stabilized with hydrophilic antistatic), PVKh (polyvinylchloride) and (from Japan) plastics made of a copolymer of ethylene-vinylacetate (designated SEVA). They have been compared with polyethylene unstabilized (PE). Test results for changes in mechanical properties are tabulated. Studies were carried

out in 1975 (Jul/Sep), 1976 (Apr/Oct) and 1977 (Apr/Sep). Tests are not conclusive. It is pointed out that the polymers age more rapidly under greenhouse conditions, hence if new forms are being tested for use in agriculture, it is precisely under greenhouse conditions that testings should be made.
[87-8586]

UDC 628.743.21-416/01:63

ATMOSPHERE-RESISTANT PVC-PLASTICS DESIGNED FOR USE IN AGRICULTURE

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 30-31

ORDYNSKAYA, T. M., VILENSKIY, V. A. and SEREDA, O. V.

[Abstract] Output of plastics is to increase in the current Five-Year Plan to 434 thousand t. In agriculture, especially for covering greenhouses and seed hot houses, about 25-30% of the total amount of plastics is being used. Polyethylene (PE), most widely used, is subject to aging. Polyvinylchloride (PVC) plastics have some advantages over PE in resistance to the atmosphere, better physical chemical properties, ability to reflect heat rays, etc. The USSR has devised a standard, GOST 16272-70 for PVC plastic with "C"-tradename; it lasts 2-3 years, depending on climate conditions. It is made, by extrusion, at the Dzerzhinsk PO "Kaprolaktam" and, by the calendar-roll method, at the Nizhne Tagil plastics factory. Physical and chemical properties of "S" and of other PVC plastics are tabulated and discussed. It has been found that PVC plastic which contains a stabilizer (obtained from the West German firm Berlecher) and, also "PVC-10P" are more stable than "S". Use of the Berlecher stabilizer with "S" was tested in Feb 1977 at the greenhouse sovkhoz imeni Vasil'yev in the Kiev Oblast with promising results. Figure 1; references: 3 Russian.
[87-8586]

UDC 678.06:63/003.13

ECONOMIC EFFICIENCY OF USE OF POLYMERIC MATERIALS TO STORE AND TRANSPORT AGRICULTURAL PRODUCTS

Moscow PLASTICHESKIYE MASSY in Russian No 12, 1979 pp 32-35

SERGIYENKO, T. YE. and GENEL', S. V.

[Abstract] Polymeric materials are used in Soviet agriculture, in reclamation and in water management. Data of the USSR Ministry of Agriculture indicate that their use has had an economic effect of 4.3 thousand rubles/ton, i.e., 2.5-fold higher than the analogous figure for the national economy as a whole. Use of plastics for packaging, transport and storage is said to use up 40-45% of the total quantity of plastics used in agriculture, in the US; plastics are also of great importance in the USSR for the purposes cited and for preparing fodder. Figures are cited for the use of plastics in storage and transport of fresh vegetables, fruits and berries. Losses have been cut down. A way to calculate the economic effect of storing fruits and vegetables is developed and expressed by a mathematical formula. A common study of the conditions of industrial storage of fruits and vegetables in a modified atmosphere with use of plastic containers with membranes of selectively-permeable plastic material has been underway; associated in this work are i) the Problem Laboratory of Polymers of the Moscow Technological Institute of the Meat and Dairy Institute, ii) the Moscow Agricultural Academy imeni K. A. Timiryazev, iii) the NPO "Plastik", iv) the Moscow Cooperative Institute and v) the Kiev Trade-Economic Institute. The membrane used has, by selective gas-exchange, helped to protect the agricultural products. Also assisting in this effort has been the Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences. The efficiency of storage of fruits and vegetables in plastic containers with membranes which are selective gas exchangers is tabulated. The NPO "Plastik" and the Problem Laboratory of Polymers (of the Moscow Technological Institute cited above) has also developed reinforced plastic which is made into wind and snow-resistance packaging and can be used to protect hay and silage fodder. An economy of 525 million rubles is projected for 1980 if plastics are fully exploited. References: 20 Russian.
[87-8586]

UDC 541(64+183.12)

NONSTOICHIOMETRIC POLYELECTROLYTE COMPLEXES--NEW WATER-SOLUBLE MACROMOLECULAR COMPOUNDS

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian No 12, 1979 pp 2719-2725 manuscript received 23 Oct 78

KHARENKO, O. A., KHARENKO, A. V., KALYUZHNAYA, R. I., IZUMRUDOV, V. A., KASAIKIN, V. A., ZEZIN, A. B. and KABANOV, V. A., Moscow State University imeni M. V. Lomonosov

[Abstract] Nonstoichiometric polyelectrolyte complexes (PC), representing the products of complete reactions between opposite-charged polyelectrolytes are, unlike stoichiometric PC, water-soluble, and thus are of interest since their existence makes possible investigation of PC by classical methods. In this connection, different methods for obtaining nonstoichiometric water-soluble PC for different electrolyte pairs are reviewed and it is shown that all these methods are based on the same principle of mixing together the necessary proportions of two completely ionized polyelectrolytes in the presence of low-molecular salt. The macromolecular characteristics of such PC are unaffected by the method of their synthesis, regardless of whether the LPE (lyophilizing polyelectrolite--the polymeric ingredient accounting for the solubility of PC in water) is a polymeric anion or a polymeric cation. This warrants regarding such polycomplexes as equilibrium formations representing new macromolecular compounds. The solubility of the PC in which the LPE is the weak polyelectrolyte markedly depends on the state of the ionization of its groups, since a decrease in the degree of their dissociation is accompanied by loss of PC solubility. Figures 3; references 13: 11 Russian, 2 Western.
[77-1386]

UDC [678.674"525"420:574.582.2]54.057

SYNTHESIS OF POLYETHYLENETEREPHTHATE WITH ADDITIVES OF TEREPHTHALIC ACID AND ITS ACIDS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 6, submitted 30 Jan 79 signed to press 28 Nov 79 pp 12-14

SHEVCHENKO, V. V., MIKHAYLOV, G. D. and POLYAKOV, L. V.

[Abstract] Regularities of the process of synthesis of polyethyleneterephthalate with additives of terephthalic acid and its ethers were considered as a combination of reactions of electrification, transesterification, acidolysis and ether exchange. The reaction capacity of the additive and its level in the mixture was found to produce the basic effect on the rate of reaction. The data presented justify the practical use of additives of reactive bifunctional compounds to intensity the polycondensation process in production of polyethyleneterephthalate. References 10; figures 2.
[76-2791]

UDC 677.494.674.54.057

PRODUCTION OF BIS (BETA-OXYETHYL)TEREPHTHALATE FROM ETHYLENE OXIDE AND TEREPHTHALIC ACID

Moscow KHIMICHESKIYE VOLOKNA in Russian No 6, submitted 13 Dec 78 signed to press 28 Nov 79 pp 10-12

BAGROV, B. M., MIKHAYLOV, G. D. and MALYKH, V. A.

[Abstract] Competing kinetic models of reactions occurring at the stage of production of bis (beta-oxyethyl) terephthalate (BOEFT) were examined, discrimination models were presented and their kinetic parameters were evaluated. A kinetic model was obtained which permits prediction with accuracy sufficient for practical purposes (5 percent for ethvlene oxide, terephthalic acid and bis (beta-oxyethyl terephthalate) and 15 percent for diethylyne glycol derivatives) of the composition of the reaction mixture in the $373\ K \leq T \leq 443\ K$; $0.5 \cdot 10^{-2} \leq A_0 \leq 10^{-1}$ kmole · m^{-3} range of parameters. References 5.
[76-2791]

UDC 677.494.675:66.019

CAUSES OF FORMATION OF UNSTRETCHED SECTIONS IN POLYAMIDE TEXTILE THREADS

Moscow KHIMICHESKIYE VOLOKNA in Russian No 6, submitted 4 Dec 78 signed to press 28 Nov 79 pp 6-7

AVER'YANOV, A. A., ARKHIPOVA, L. M., MESHKOVA, B. YU. and FIL'BERT, D. V.

[Abstract] Causes and mechanisms of occurrence of so-called unstretched sections of polyamide textile threads which produce thickening of the elementary fiber of complex thread for a length of several mm up to several cm were discussed and some suggestions were offered for removal of such defects. Experimental data were presented which indicate that this defect arises from irregularities in the newly formed thread due to improper moisture content, flaws in the original polymer, irregularities in wetting the thread on the spinning frame or moisture exchange with the environment. Measures taken to eliminate such flaws at the Daugavpils Chemical Fiber Plant were discussed. References 2; figures 2.
[76-2791]

UDC 678:744

COMBINED POLYMERIZATION OF STYRENE AND NITROGEN CONTAINING DERIVATIVES OF ITACONIC ACID

Tashkent UZBEKSKIY KHIMICHESKIY ZHURNAL in Russian No 5, submitted 14 Feb 79 signed to press 30 Oct 79 pp 37-41

ASKAROV, M. A., TUKHTAYEV, KH. R. and GAFUROV, B. L., Uzbek SSR Academy of Sciences Institute of Chemistry

[Abstract] Kinetics of combined polymerization of styrene and diamides of itaconic acid and determination of some kinetic parameters in their presence and absence were studied. It was shown that polymerization of styrene in the presence of nitrogen containing derivatives of itaconic acid involves participation of mobile hydrogen atoms in transfer of the chain and in the formation of low-activity radicals. An increase of level of tacondiamides in the initial mixture reduced the yield of colpolymers and eliminated the gel-effect. According to copolymerization constants, tetramethyldiamide was more active than tetraethyldiamide and dipiperide of itaconic acid. References 8; figures 6.
[84-2791]

UDC 678.675:678:66.095.3

SYNTHESIS OF POLYAMIDES FROM DIMETHYL ETHERS OF DICARBOXYLIC ACIDS

Tallin IZVESTIYA AKADEMII NAUK ESTONSKOY SSR-SERIYA KHIMIYA in Russian No 4, 1979, submitted 23 Jan 79 pp 253-256

KONGAS, A., KIRET, O. and RAYALO, G., Estonian SSR Academy of Sciences Institute of Chemistry

[Abstract] A new catalyst for polycondensation of dimethyl esters of dicarboxylic acids with hexamethylenediamine was found and described. This is a compound of the type $(Ti(OR)_4$, where R is ethyl, propyl, butyl, or isobutyl. A mechanism of catalysis and a mathematical model of the process was proposed and some kinetic constants were calculated. References 9.
[80-2791]

UDC 541.64

BRANCHING DURING ETHYLENE POLYMERIZATION WITH ZIEGLER-NATTA CATALYSTS

Minsk IZVESTIYA AKADEMII NAUK BSSR--SERIYA KHIMICHESKIKH NAUK in Russian No 6, 1979 pp 5-9

YEROFEYEV, B. V., VALENDO, A. YA., VESHTORT, V. Z., KOSTYAN, L. P. and KUSHEL', M. I., Institute of Physical Organic Chemistry, Academy of Sciences Belorussian SSR

[Abstract] Comparative studies were conducted on ethylene polymerization using only a $TiCl_4$-$AlEt_2Cl$ catalyst system, or one supplemented with organometallic compounds ($MgPh_2$; Mg, Mn, Fe, and Co stearates). IR spectra of the resultant polyethylenes showed that in the $TiCl_4$-$AlEt_2Cl$-$MgPh_2$ system branching was diminished and that a higher molecular weight product was obtained than with the $TiCl_4$-$AlEt_2Cl$ system. Introduction of the other metal cocatalysts yielded similar results. The effect of the metal ions in reducing branching was ascribed to modifications in the titanium active sites on the catalytic surface which inhibited transfer reactions and chain breakage, leading to the formation of linear, high molecular weight, polyethylene chains. Tables 2; figures 2; references 14: 1 Belorussian, 4 Russian, 9 Western.
[94-12172]

UDC 66.066

STRUCTURE AND PROPERTIES OF MICROPOROUS CAPRON MEMBRANES

Minsk IZVESTIYA AKADEMII NAUK BSSR--SERIYA KHIMICHESKIKH NAUK in Russian No 6, 1979 pp 17-21

ARTAMONOV, V. A., MOSTOVLYANSKIY, O. A. and SOLDATOV, V. S., Institute of General and Inorganic Chemistry, Academy of Sciences Belorussian SSR

[Abstract] Structural (electron microscopy) and filtration characteristics of capron microfiltration membranes were investigated for the purpose of determining improvements that need to be made to insure better performance. The resultant data indicated that the membranes under study possessed an isotropic porous structure with a narrow pore size spread (63-90%) in terms of radii (0.1-1 μm). Thus, further improvements should be directed at increasing the number of open pores by incorporating methods yielding a fibrillar structure and the introduction of anisotropic pore structure to enhance permeability and complement the selectivity innate to isotroy. Figures 3; references 5 Russian.
[94-12172]

UDC 541(127+15+64):547(313.2+256.2)

COMPARISON OF THE KINETIC AND RADIOCHEMICAL METHODS FOR THE DETERMINATION OF THE ELEMENTARY CONSTANTS OF THE POLYMERIZATION OF ETHYLENE BY THE VCl_4-(iso-$C_4H_9)_2AlCl$ SYSTEM

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian No 2, 1980 pp 248-255 manuscript received 12 Jul 78

POMOGAYLO, A. D., BAYSHIGANOV, YE., MAMBETOV, U. A. and KHVOSTIK, G. M., Division of the Institute of Chemical Physics; Institute of the Chemistry of Petroleum and Natural Salts, Kazakh SSR Academy of Sciences

[Abstract] Both the kinetic and the radioactive methods were used to determine the number of growth centers n_p and compute the constants of the elementary stages (growth, chain transfer onto monomer, aluminum-alkyl) and the mean lifetime $\bar{\tau}$ for the polymerization of ethylene by the system VCl_4-(iso-$C_4H_9)_2AlCl$. The kinetic method is based on the determination of $1/\bar{P}_v$ as a function of w_p/Q_τ, where w_p is the polymerization rate and Q_τ is the amount of polyethylene forming per time unit. The unsteady-state nature of the system VCl_4-(iso-$C_4H_9)_2AlCl$ was found to be associated with

the decrease in n_p with time (by a factor of 45 times within 30 min). The growth rate constant k_p determined by the kinetic method was found to be close to its counterpart determined by the radiochemical (^{14}CO) method ($7.5 \cdot 10^3/\partial$ and $18.5 \cdot 10^3$ l/mol·sec, respectively), while the values of τ determined by these methods were 80 and $33/\partial$ sec, respectively. By contrast with titanium-containing catalytic systems, in vanadium-containing systems the introduction of ^{14}CO for tagging purposes is easier (owing to the lower acidity of the vanadium centers as well as to the specificity of the V-C bond). Figures 5; references 17: 8 Russian, 9 Western.
[122-1386]

UDC 541.64:539.3

EFFECT OF FEATURES OF THE TRANSITION OF SKN-40 RUBBER FROM HIGHLY ELASTIC STATE TO VITREOUS STATE ON THE TEMPERATURE-RATE ANALOGY OF BREAKING STRESS

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian No 2, 1980 pp 297-302
manuscript received 12 Oct 78

SOLOV'YEV, YE. M., KITAYEV, YU. B., GUL', V. YE. and ZAKHAROV, N. D.,
Yaroslavl' Polytechnical Institute

[Abstract] The effect of straining rate, resulting in the conversion of polymers from highly elastic to vitreous state was investigated on SKN-40 rubber. Specimens of that rubber were dilatationally strained, on plotting the resulting stress-strain curves. It was found that the vitrification point of that rubber (normally 246 K) does not get displaced into the range of plus temperatures when the straining rate is changed from $17 \cdot 10^{-4}$ to 10 m/sec, if determined as a function of the maximum "true" strength of the rubber. If determined as a function of the elasticity modulus, however, the vitrification point of the rubber changes by ~25-30°, presumably because in the former case back-transition from vitreous to forced-elastic state may occur owing to the appearance of local visco-elastic processes. General curves of the temperature-rate dependence of strength of the specimens for quasiisothermal (at low straining rates) and adiabatic (at high straining rates) modes of straining are derived. It is shown that in principle it is possible to predict the behavior of elastomers in the dynamic mode with the aid of data obtained at low straining rate upon introducing a temperature correction for the adiabatic mode associated with the high straining rate. Figures 5; references 19: 13 Russian, 6 Western.
[122-1386]

UDC 678.743.41

POLYHEXAFLUOROPROPYLENE

Moscow PLASTICHESKIYE MASSY in Russian No 1, 1980 pp 13-14 manuscript received 25 Jun 78

DUNAYEVSKAYA, TS. S., PANSHIN, YU. A. and ANDREYEVA, A. I.

[Abstract] This article is a synopsis of literature data on the synthesis, structure, and properties of the title material. The first solid high-molecular-weight polyhexafluoropropylene (PHFP) was prepared by the polymerization of hexafluoropropylene (HFP) at high temperatures and pressures using such free-radical initiators as mercury bistrifluoromethylmercaptides ($Hg(SCF_3)_2$) or tin tetrafluoroacetate. Subsequent refinements and other methods are considered. The various methods of preparation gave rise to materials with slightly different properties. Thus the early data on the structure of PHFP were equivocal. The presence of an intense crystallinity reflex in the X-ray diffraction spectrum was considered as evidence for a high degree of crystallinity of the structure. Calculations of the conformational energy as a function of the internal rotation of the C-C bonds show that the most stable configuration of the isotactic PHFP is a spiral with a C-C-C angle of 113±2°. Some of the physical-mechanical properties of the PHFP are as follows: density, 2.08; softening temperature, 498°-523°; and dielectric permeability, 2.1. Others are mentioned. References 13: 10 Western, 3 Russian.
[131-12027]

UDC 678.632'32'21.048.019-9

METHODS FOR INCREASING THE THERMAL STABILITY OF PHENOLFORMALDEHYDE POLYMERS AND MATERIALS BASED ON THEM

Moscow PLASTICHESKIYE MASSY in Russian No 1, 1980 pp 28-29

[Abstract] The thermal stability of phenolformaldehyde polymers (PFP) can be changed through the addition of stabilizers and the modification of its structure. The most effective additives known at the present time are powdered metals, their oxides and salts. The introduction of 20% W, Nb, Ti and Cr results in a 73% increase in the coking residuel at 1373°K. Al powder (optimum about 0.05%) also stabilizes PFP. The mechanism responsible appears to be associated with the formation of intermediate ionic-covalent bonds between the powder and the polymer, which in turn alters the

intermolecular structure. The addition of transition metal oxides (Fe_2O_3, MnO_2, or Cr_2O_3) decreases the thickness of the carbon residue layer during coking. Some Ca and Mg compounds, as well as the borates, carbonates, chromates, and fluorosilicates of zinc and amorphous boron and silica also act as stabilizers. Organic compounds, such as dimethyl-di-p-phenylamino-phenoxy)-silane; 2-(phenylazo)-1,3-phenylendiamine; 2,4,6-tri-(phenylazo)-1,3-phenylenediamine; aminoazolbenzol; aromatic polycarbonates and various copolymers of naphthalene or anthracene with benzol, can stabilize the PFP structure. References 55: 11 Western, 44 Russian.
[131-12027]

RUBBER AND ELASTOMERS

ACHIEVEMENTS OF OMSK SYNTHETIC RUBBER PLANT DISCUSSED

Moscow IZVESTIYA in Russian 12 Jan 80 p 1

/Article by E. Mal'bakhov, Omsk: "Siberian Rubber"/

> /Text/ Constantly increasing the output of synthetic rubber and of materials for the production of plastics, Omsk petrochemists successfully fulfill the outlined goals.

Butane gas is the main raw material of the synthetic rubber plant. Only sensitive instruments "observe" the industrial processes hidden in hermetic columns. Two-pood briquets of rubber, without which no sector of the industrial rubber industry, primarily the tire industry, can do, can be finally seen only at the finished output warehouse. The most reliable consumer is next to it. This is the Omskshina Association.

The personnel of the group of shops of the Atsetal'degid Production Facility, which produces raw materials for the output of plastics, has success in the socialist competition. It fulfilled the program for 4 years of the five-year plan 2 months ahead of schedule. More than 5 million kwh of electric power (throughout the plant 11 millions) and 1,240 tons of ethylene were saved. The shifts of Valentina Shabalina, deputy of the Omsk City Soviet, and of Anatoliy Isayenko work in a shock way.

People also work at the same pace in Orgsintez shops. All alpha-methylstyrene is now produced with the State Badge of Quality, the production volume increasing by almost one-third in 4 years. The names of operators N. Kukharenko and V. Nechto, of fitter N. Antuf'yev and of many others are pronounced with respect.

"The assignment for labor productivity growth at the enterprise was overfulfilled by 5.7 percent," M. Raykhel'gauz, chief of the economic laboratory, says. "This is the result of introduction of new equipment and of rationalization, which produced an economic effect of 1.1 million rubles."

The profitability of the enterprise increased considerably. From 60 to 100 percent of the basic grades of rubber and latex have a higher category of quality. The plant is growing and builders are erecting new wings. At the same time, certain existing production facilities are being reconstructed.
[89-11,439]

11,439
CSO: 1841

UDC 678.4.063/678.049/665.637.567/66.082.2

PREPARATION OF A PLASTICIZER FOR TIRE RUBBER BY VACUUM CONCENTRATION OF EXTRACTS OF WESTERN SIBERIAN OILS

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 1, 1980 pp 39-41

ZAVIDOV, V. I., POCHUYEV, P. N. and SHUBINA, N. S., Lower Volga Branch of GrozNII

[Abstract] Studies of low viscosity residual extracts for the title application indicate that such material significantly improves the characteristics of tire rubber, for example, by increasing its heterogeneity. An increase in the viscosity, density, and aniline point of the extract was observed with the increasing depth to which it was concentrated. This can be explained in that during the concentration, part of the paraffinic and naphthenic hydrocarbons is lost through distillation leading to a concentration of the aromatic components in the residuel. The yields from two different feed stocks from residual distillate extractors were 57-65% and 68-72%, the higher yield being from the heavier feed stock. The obtained material met all technical standards governing plasticizers for tire rubber. Figures 2; tables 1.
[138-12027]

UDC 541.64:547.539.1

STRUCTURALIZATION OF SKF-26 FLUORINE RUBBER BY MEANS OF PHOSPHORUS-CONTAINING HYDROQUINONE DERIVATIVES

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian No 12, 1979 pp 2708-2712 manuscript received 18 Oct 78

KARASEV, L. P., BUKALOV, V. P., VAL'DMAN, A. I., NIFANT'YEV, E. YE. and TUSEYEV, A. P., All-Union Scientific Research and Design-Technological Institute of the Rubber Industry

[Abstract] It is shown that SKF-26 fluorine rubber gets structuralized on reacting with biphosphorylated derivatives of hydroquinone and forms vulcanizates with a large number of valuable physicomechanical properties. The structuralization occurs as a result of the alkylation of phosphites by the fluorine rubber, with formation of a phosphorus-carbon bond. The high-temperature continuous chemical stress relaxation method was used to investigate the process of the thermooxidative destruction of the resulting mesh

structures as a function of 50% dilational straining at 210-270°C. The chemical resistance of the cross-links was investigated as a function of the effect of concentrated nitric acid, and was found to differ depending on the phosphite used. Figures 2; references: 12 Russian.
[77-1386]

UDC 678.664:54-14.004.12

PRODUCTION AND CERTAIN PROPERTIES OF ELASTIC POLYURETHANE OXIAMINES

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 7-10 manuscript received 9 Apr 79

MOROZOV, YU. L., AL'TER, YU. M., PRIBYLOVA, L. M., Scientific Research Institute of Rubber and Latex Products

[Abstract] A study was made of the peculiarities of the production and properties of polyurethane oxiamines based on oligoester (diene) urethane diamines and epoxy compounds of various types. The polyurethane oxiamines were synthesized both in mass by mixing of preheated coreagents with subsequent molding and thermostating, and in solution by pouring of a mixture of 30% solutions of the coreagents in chlorophorm into cuvettes and thermostating after complete removal of the solid. The curing temperature was 100-120 C. Completion of curing was judged by disappearance or stabilization of the intensity of the absorption band at 917 cm^{-1}. The physical and mechanical properties of specimens in the form of 0.2-0.4 mm films were determined by standard methods. The results of the studies showed that by varying the nature and relationship of oligomer diamines and flexible-chain and rigid-chain epoxy resins, one can obtain polymers with 3-dimensional structure and a broad range of physical and mechanical properties--from rigid plastics to highly elastic rubbery materials. Figures 3; references: 13 Russian.
[83-6508]

UDC 678.762.3.063.01:539.3:
66.092.46.8:678.046

INFLUENCE OF SURFACE-ACTIVE AGENTS ON VISCOELASTIC PROPERTIES OF SKI-3 RUBBERS

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 16-19 manuscript received 9 Aug 78

SAGAYDAK, S. YA., GORELIK, B. M., DONTSOV, A. A., GARTSMAN, V. I., Scientific Research Institute of the Rubber Industry

[Abstract] A study was made of the possibility of varying the components of the complex dynamic modulus of rubbers by adding various quantities of surfactants. The influence of the type and concentration of surfactant on the modulus of elasticity in harmonic shear and the mechanical loss angle tangent was studied in SKI-3 rubbers with various contents of active fillers. Surfactants used were of two types: nonionogenic and anionactive. Technical carbon was used as the inert filler. The vulcanizing group consisted of sulphur, sulfenamide C, zinc oxide and stearic acid. It was found that varying the quantity of surfactant and filler, as well as the degree of activity on the technical carbon, can significantly influence G' and $\tan \delta$. Thus, the use of surfactant additives can significantly vary the dynamic parameters of rubbers, and is promising from the standpoint of possible regulation of viscoelastic properties without deterioration of physical-mechanical parameters. Figures 3; references: 9 Russian.
[83-6508]

UDC 678.048:678.762.3

NEW HIGH-MOLECULAR-WEIGHT ANTIOXIDANTS FOR SKD RAW RUBBER

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 22-23 manuscript received 4 Dec 78

DOMNINA, N. S. and KIRPICHEV, V. P., Leningrad State University imeni A. A. Zhdanov

[Abstract] Results are presented from a study of the possibility of using products of the modification of the epoxy oligomer γ-4-oxy-3-5-di-tert butylphenylpropionic acid and γ-4-oxy-3-5-di-tert butylphenylpropoylamine, as well as an oligomer with terminal isocyanate groups, γ-4-oxy-3-5-di-tert butylphenylpropyl alcohol, as high-molecular-weight raw-rubber antioxidants.

SKD raw rubber (M=250,000) was purified of low-molecular antioxidants by double reprecipitation in ethyl alcohol from a benzene solution. Polymer antioxidants are seen to protect the raw rubber more effectively from oxidation than low-molecular derivatives of 2, 6-di-tert butyl-4-alkylphenol, and are comparable in stabilizing effect to ionol. The high molecular compounds are thus effective raw rubber stabilizers, the use of which is particularly desirable when polymers must operate under high temperature conditions or in contact with solvents. Figures 2; references: 6 Russian.
[83-6508]

UDC 678.031.5.063-416.019.32

SPECIFICS OF ATMOSPHERIC AGING ON FILMS OF NATURAL LATEXES

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 25-27 manuscript received 11 May 79

KRAYUSHKINA, YE. I., TAROSOVA, Z. N., CHERNAYA, V. V. and SHTEYNBERG, S. A., Scientific Research Institute of Rubber and Latex Products

[Abstract] Structural factors play a significant role in processes of aging and stabilization of elastomers. A study was made of the specifics of atmospheric aging of unfilled films 0.7-0.9 mm thick of natural revultex and qualitex rubbers. These latexes characteristically have globular structure but different distribution of vulcanization bonds due to the peculiarities of their manufacture. The films were subjected to atmospheric aging in Tashkent and accelerated aging under artificial light. The difference in kinetics of aging of films produced from latexes of the same polymer and with the same parameters of the vulcanization grid apparently result from the peculiarities of their structure and differences in distribution of vulcanization bonds. The results of the study show that the topology of the vulcanization grid has a significant influence on the stability of latex films against aging and stabilization. Figures 5; references 10: 8 Russian, 2 Western.
[83-6508]

UDC 678.763.2:678.043

A NEW VULCANIZING AGENT FOR CHLOROPRENE RUBBERS

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 23-25

PASTOR, T. I., DEVIKINA, L. I. and KRASOVSKIY, V. N., Leningrad branch, Scientific Research Institute of Rubber Industry, Leningrad Technological Institute imeni Lensovet

[Abstract] A study was made of the possibility of using milled metallurgical and shale slags, the mineral portions of which contain various metal oxides, as vulcanizing agents for the production of polychloroprenes. The compositions of the slags are presented. The slag particle diameters did not exceed 40 um. They were found to be effective vulcanizing agents, significantly increasing the duration of the induction period of vulcanization of the rubber mixture, increasing the resistance to thermal aging and retaining good mechanical properties of finished products.
[83-6508]

UDC 678.742.2-134.23,074:678.4.029.5:669

INFLUENCE OF OLIGODIENE URETHANE ACRYLATE ON PROPERTIES OF VULCANIZATES OF ETHYLENE-PROPYLENE COPOLYMERS

Moscow KAUCHUK I REZINA in Russian No 11, 1979 pp 33-34 manuscript received 23 May 79

LOTAKOV, V. S., YEVCHIK, V. S., MARKOVA, L. A. and NOSACH, G. D., Dnepropetrovsky Branch, Scientific Research Institute of the Rubber Industry

[Abstract] A study was made of the influence of oligodiene urethane acrylate type PDI-4AK on the bonding strength of rubbers to metal through a layer of leuconate adhesive. The molecular mass of the oligomer was ~5000. The metal surface was preliminarily degreased, treated with highly dispersed corundum sand in a sand blasting apparatus and two layers of luconate glue were applied. The rubber mixture was placed on the prepared metal surface and vulcanized in a hydraulic press at 160 C for 40 minutes. The presence of PDI-4AK results in the formation of firm chemical bonds at the interface between the adhesive and the rubber, greatly increasing the adhesive strength of the system. References: 7 Russian.
[83-6508]

UDC [678.741:54-14].004.12

CERTAIN PROPERTIES OF LOW-MOLECULAR POLYPENTENAMER

Moscow KAUCHUK I REZINA in Russian No 12, 1979 pp 10-13 manuscript received 6 Jun 79

YEFIMOV, V. A., SUMERKIN, A. N., TUROV, B. S. and SHILOV, A. D., Yaroslavl' Polytechnic Institute

[Abstract] The oligomers of cyclopentene synthesized by cometathesis of cyclopentene and hexene-1 in the presence of the complex catalyst $WCl_4 \times [OCH(CH_2Cl)_2]_2$-alkylaluminiumhalogenide were investigated. It was found that these oligomers display a broad molecular-mass distribution owing to the large number of the reactions occurring in the system. As their concentration of linear olefin increases, the characteristic viscosity and the mean molecular mass of the oligomers decrease. The polydispersity factor of the oligomers varies from 2 to 20 depending on the conditions of their synthesis. It is established that the oligomers exist in two crystalline states that differ in their melting point. The melting points and integral heats of fusion of the oligomers are determined. It is also concluded that, all other conditions being equal, cyclopentene-based oligomers display a higher viscosity range than does low-molecular cis-butadiene. Thus, the low-molecular polypentenamer represents a new type of oligomeric products and may be of interest for use in the paints and lacquers and tire industries. Figures 4; references 14: 6 Russian, 8 Western.
[93-1386]

UDC 678.7.01:539.37.001.5

ASPECTS OF THE RHEOLOGICAL BEHAVIOR OF DST-30 BUTADIENE-STYRENE THERMOELASTOPLASTIC

Moscow KAUCHUK I REZINA in Russian No 12, 1979 pp 16-18 manuscript received 10 Jul 78

AL'TZITSER, V. S., KANDYRIN, L. B., ANFIMOV, B. N. and KULEZNEV, V. N., Scientific Research Institute of Rubber and Latex Products

[Abstract] Knowledge of the rheological behavior of thermoelastoplastics (TEP) within the range of temperatures corresponding to the conditions of their extrusion and injection molding is desirable. In this connection, the rheological behavior of DST-30 TEP was investigated. It was found that at shear stresses of $>10^{6.3}$ dyn/cm^2 the flow of DST-30 TEP becomes stalled.

The Newtonian flow of the investigated TEP at shear stresses of 10^4-$10^{5.7}$ dyn/cm^2 in the presence of 130-170°C points to the absence of an effect of the two-phase structure of the material on the nature of its flow, and is probably due to the polybutadiene part of the molecule. The activation energy of the viscous flow of TEP is 20-24 kcal/mole, which is higher than for elastomers, and hence TEP should be processed at higher temperatures of the order of 180-200°C. It can be concluded that the processing of TEP can be improved by developing special plasticizing systems that effectively reduce the viscosity of TEP without markedly lowering its physico-mechanical indicators. Figures 3; references 8: 7 Russian, 1 Western.
[93-1386]

UDC 678.84.063.019.391

ASPECTS OF THE AGING OF SILOXANE RUBBER IN AIR

Moscow KAUCHUK I REZINA in Russian No 12, 1979 pp 26-31 manuscript received 7 Sep 78

CHUBAROVA, G. V., GOLDOVSKIY, YE. A. and DONTSOV, A. A., Scientific Research Institute of the Rubber Industry

[Abstract] It is shown that during the initial stage of the aging of two varieties of siloxane rubber, SKTV and SKTV-1, in air at 300-350°C (and for SKTV at 250°C as well), a major factor is the process resulting in the formation of the sol fraction--hydroxyl-containing dimethylsiloxane oligomers. The decrease in the strength of the rubber in that initial stage of aging is the greater the lower the extent of cross-linking of the original rubber and the higher the aging temperature are. The extent of the destructive changes in the aged rubber follows the same pattern. These changes in the physicochemical characteristics of rubber are attributable to the effect of oxygen, but the degree of oxidation of the polymer during that stage is low. Figures 5; references 11: 4 Russian, 7 Western.
[93-1836]

UDC 678.4.063.01:536.485:539.382

EFFECT OF DEFORMATION ON THE FROST RESISTANCE OF FILLED AND UNFILLED RUBBER

Moscow KAUCHUK I REZINA in Russian No 12, 1979 pp 35-37 manuscript received 1 Jun 79

BARTENEV, G. M., KUCHERSKIY, A. M., FEDYUKINA, L. P. and RADAYEVA, G. I., Scientific Research Institute of the Rubber Industry

[Abstract] The relationship between the frost resistance and deformation of rubber was investigated for specimens of filled and unfilled rubber subjected to uniform dilatational straining at pressures reaching -40°C. It was found that the effect of tensile stress on the frost resistance coefficient K increases the closer it is to the vitrification point of the filled rubber. The greater the deformation, the higher the K of the rubber becomes, whereas for unfilled rubber and for the rubber varieties containing a relatively small amount of low-activity filler, the pattern is different and K then decreases owing to the attendant increase in the orientation of the rubber chains, or it may reach a minimum and then increase. These findings should be considered when determining the frost resistance and performance of rubber products. Figures 3; references 10: 7 Russian, 3 Western.
[93-1386]

UDC 678.065.01:538.001.5

EFFECT OF PRINCIPAL PERFORMANCE CHARACTERISTICS ON THE WEAR OF AUTOMOTIVE TIRE PROTECTORS

Moscow KAUCHUK I REZINA in Russian No 12, 1979 pp 39-44 manuscript received 15 Jun 79

NOVOPOL'SKIY, V. I. and TARNOVSKIY, V. N., Scientific Research Institute of Tire Industry; Volgograd Polytechnic Institute

[Abstract] A satisfactory wear resistance of the protector is a major factor in prolonging tire life. In this connection, the effect of normal load, tire pressure, torque, braking, rolling rate, and alignment on the wear of car and truck tire protectors was investigated on a test stand. It is shown that the wear rate of car and tire truck protectors as a function of normal load and tire pressure can be described by linear equations, while the wear rate as a function of rolling rate and wheel alignment is described by exponential equations. Normal load, torque, rolling rate, and

wheel alignment are the principal factors affecting the wear rate of the car tire protectors, while the wear rate of the truck tire protectors is affected by tire pressure to a somewhat greater extent. For example, when tire pressure is increased by 20% above the recommended value, the wear rate of car tire protectors increases by 15% but that of truck tire protectors, by 20%, apparently owing to the higher existing truck tire pressure standards. Figures 5; references 12: 10 Russian, 2 Western.
[93-1386]

UDC [678.07:677.4].061.43.01"313"

PROMISING ELASTOMERS AND CORD FOR TIRES

Moscow LAUCHUK I REZINA in Russian No 12, 1979 pp 45-50

YASHUNSKAYA, F. I., Scientific Research Institute of Tire Industry

[Abstract] The prospects for the application of various types of elastomers and cord in the tire industry are surveyed for the next 20 years. The level of utilization of synthetic rubber (SR) in the Soviet tire industry is extremely high--91.5% in 1978. The most widely used type of SR in the Soviet tire industry is SKI-3 synthetic cis-1,4 polyisoprene. The properties of SKI-3 will eventually be further improved through advances in catalytic polymerization systems and addition of polar groups. Then there is the SKD cis-1,4 polybutadiene rubber, a quality tire elastomer with stereoregular structure, whose consumption is steadily increasing. The same can be said of butadiene-styrene and butadiene-methylstyrene rubber. In general, the variety of available tire rubber types will be broadened after 1980. As for cord, it will continue to be an important tire-industry material. During the 1980s and particularly during the 1990s synthetic-fiber cord based on aromatic polyamides will be extensively used along with metal cord. The polyester and fiberglass varieties of tire cord used in the United States represent unpromising types of cord and have not been introduced in the Soviet Union. If, however, the quality of the fiberglass reinforcement is improved, it could be introduced in Soviet passenger cards and pickups. References 13: 1 Russian, 12 Western.
[93-1386]

UDC 678.074:539.389

THE NATURE OF RAPID AND SLOW HYPERELASTIC DEFORMATION OF ELASTOMERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 249 No 6, 1979 pp 1377-1380 manuscript received 7 Jun 1979

BARTENEV, G. M., The Institute of Physical Chemistry, Academy of Sciences of the USSR, Moscow

[Abstract] Data from relaxational spectrometry and structural features of elastomers during slow and rapid phases of hyperelastic deformation show sharply different stages. The rapid stage was shown to be connected to segmental movement of macromolecules, while slow deformation is related to local van der Waals bonds between macromolecules, and their gradual decomposition. The structure of elastomers appeared to be composed of free segments and chains, on the one hand, and orderly sections and bound segments, on the other. Figures 3; references 13: 10 Russian, 3 Western.
[119-12131]

UDC 678.046.361:620.187

SPECIFICS OF THE PROCESS OF STRENGTHENING OF ORGANOSILICON RUBBER TYPE SKT BY AEROSILS WITH VARYING SPECIFIC SURFACE

Kiev KHIMICHKESKAYA TEKHNOLOGIYA in Russian No 6, Nov/Dec 79 pp 15-17 manuscript received 17 May 79

SAZYKINA, O. N. and ZAKORDONETS, S. M., Kiev Branch of Scientific Research Institute for Rubber and Latex Products

[Abstract] The authors performed electron microscopic, colorometric and physical-mechanical studies of polydimethylsiloxane rubber reinforced with aerosils with varying specific surface. The specimens were prepared on a laboratory roll mill by mixing the raw rubber with the aerosil in a ratio of 100:35 parts by weight with subsequent pressing and heat treatment of the mixture for 30 minutes at 200 C. Aerosils with specific surfaces of 175, 300 and 380 m^2/g were used. Swelling decreased with increasing specific surface, which was explained by increasing rigidity of the macromolecules in the boundary layers under the influence of the solid surface, preventing swelling by changing the conformation of the polymer macromolecules. The specific surface also greatly influenced the thermal properties of the silicone rubbers. A significant decrease in the thermal effect of crystallization and an increase in the melting point occurred with increasing specific surface. Figures 2; references 9: 8 Russian, 1 Western.
[116-6508]

UDC 678.762.3.048

SYNTHESIS OF POLYISOPRENE STABILIZERS IN A SERIES OF ACID PHOSPHITES

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 52 No 7, Jul 79 pp 1600-1604

TUSEYEV, A. P., KARPOVA, L. V., VAL'DMAN, D. I., et al

[Abstract] Mono- and di-alkyl esters of phosphorous acid are effective polymer modifiers. Esterification of phosphorous acid with p-hydroxydiphenylamine, p-hydroxyphenyl-β-naphtylamine, bis-2-hydroxy-5-methyl-tert-butylphenylmethane and 2,6-di-tert-butyl-4-methylphenol yielded acid phosphites proved to be very effective stabilizers of cis-1,4-polyisoprene. During the aging process, these phosphites modify the polymer by adding to its double bonds. Polymer modifications with these phosphites during the sulfur vulcanization process yields a rubber with increased heat stability, for performance in organic solvent media. Figures 2; references 15: 11 Russian, 4 Western.
[38-7813]

UDC 662.741.3.022:622.7.001.5

INVESTIGATION OF THE SELECTIVE FLOCULLATION OF COAL TAILINGS USING LATEX

Moscow KOKS I KHIMIYA in Russian No 9, 1979 pp 9-12

LYADOV, V. V., GRYANKO, V. I., NIKITIN, I. N., et al, Makeyev Coke-Chemical Plant, UKhIN, Voronezh Plant

[Abstract] The selective flocullation method of coal tailings (coagulation) is based on the action of various reagents capable of stabilizing argillaceous particles and precipitating coal particles. Until now, this operation was practiced only on a laboratory scale and in pilot plants. Now, it was shown that latexes made from divinyl styrene, using the emulsifiers mekal and potassium parafinate, showed satisfactory selective flocullating abilities, enriching coal tailings very effectively. The use of relatively small quantities of the latex (150-300 g/t) led to an effective separation of the pulp into argillaceous and coal components. Higher levels of the latex increased the moisture content of the concentrate. The appearance of foaming led to a less effective separation, since foam captured considerable amounts of coal flocules. Figure 1; references 6: 4 Russian, 1 Polish, 1 Western.
[42-7813]

UDC 678.743.41.84.002.612

PROPERTIES OF NEW GASOLINE, OIL, HEAT AND FROST RESISTANT RUBBERS AND VULCANIZATES BASED ON THEM

Moscow KAUCHUK I REZINA in Russian No 2, 1980 signed to press 31 Jan 80 submitted 11 Jun 79 pp 9-10

YUZHELEVSKIY, YU. A., SOKOLOV, S. V., GRINBLAT, M. P. and MELESHKEVICH, V. P., (All-Union Scientific Research Institute of Synthetic Rubber imeni S. V. Lebedev)

[Abstract] New elastomers (SKTF and SF) being synthesized at the institute are insoluble in saturated and aromatic hydrocarbons as well as in cyclic ethers and esters and are superior to rubber A-100 in heat resistance and frost resistance. Vulcanizates from SKTF and SF are equal to vulcanized A-100 rubbers in heat resistance and are superior to them in resistance to orgnaic solvents and in maintenance of their elastic properties at -60° to 70°C.

[130-2791]

UDC (678.742.2-139+678.762.2-134.352),063.002.612

EFFECT OF THE TYPE OF SKEPT ON THE PROPERTIES OF RUBBERS BASED ON A COMBINATION OF IT AND BUTADIENENITRILE RUBBER

Moscow KAUCHUK I REZINA in Russian No 2, 1980 signed to press 31 Jan 80 submitted 8 Jan 79 p 12

PLEKHANOVA, A. L., CHEKANOVA, A. A. and ZAKHAROV, N. D. (Yaroslav Polytechnical Institute)

[Abstract] A study of properties of resins based on a combination of butadienenitrile rubber SKN-40M and SKEPT polymer containing as a third comonomer dicylcopentadiene (DTsPD) and ethylidene norborene (ENB) showed that use of ENB as the third comonomer in SKEPT increases the strength of the vulcanized rubbers probably due to the increase of the rate of vulcanization of the SKEPT phase. The fatigue limit of rubbers containing SKEPT and DTsPD is higher than that containing SKEPT and ENB. The degree of vulcanization of SKEPT with DTsPD phase is lower than that in highly unsaturated rubber. Selection of the rigidity of SKEPT and the type of the third copolymer in it makes possible regulation of properties of rubbers based on its combination with SKN-40M during use of an ordinary vulcanization system. References 5: 3 Russian, 2 Western.

[130-2791]

UDC 678.742-136.23;678.043

PECULIARITIES OF INHIBITION OF NITRO-HARDENING OF BUTYL RUBBER BY SPATIALLY HINDERED PHENOLS

Moscow KAUCHUK I REZINA in Russian No 2, 1980 signed to press 31 Jan 80 submitted 3 May 79 pp 13-16

ZORIK, V. V., KOMAROV, V. F., KOROLEV, G. V. and GURVICH, YA. A.

[Abstract] The kinetics of the reaction of vulcanization of butyl rubber by an n-XDO-M_nO_2 system inhibited by substituted phenol was studied. In the presence of 2,4,6-highly inhibited phenols after the induction period, the rate of hardening of the rubber and the thickness of the cross links increased due to formation of active intermediate compounds--quinol ethers. A mechanism of inhibited vulcanization of butyl ether was presented. References 7: 5 Russian, 2 Western.
[130-2791]

UDC 678.762.2-134.352.678.045.2

A NEW PRE-CURING INHIBITOR OF RUBBER MIXTURES BASED ON SKN-40M

Moscow KAUCHUK I REZINA in Russian No 2, 1980 signed to press 31 Jan 80 submitted 12 Dec 78 pp 28-29

MISHIYEV, R. D., SALKHOV, M. S., AKHMEDOV, G. G. and BABEYEV, R. KH., Institute of Organochlorine Syntheses of the Azerbaijan SSR Academy of Sciences

[Abstract] A study of the possibility for use as a pre-vulcanization inhibitor of rubber mixtures based on SKN-40M of a polyfunctional compound, the structure of which contains a chlorine atom, an ethylene and epoxy bonds and also carboxylic groups--1, 8, 9, 10, 11, 11-hexachlorotricyclo $[6.2.1.0^{2,7}]$ undetz-9-cene-3.6-epoxy-4.5-dicarbonic acid, synthesized from furan, maleic anhydride and hexachlorocyclo-pentadiene by the Diels Alder reaction with subsequent boiling in water of the anhydride produced indicated that introduction of a small quantity of chlorine containing dicarboxylic acid (0.5 - 3.0 mass. parts) increased the pre-curing time of the rubber mixture occurred from 35 to 50-51 minutes. The mechanical properties of the rubbers and their resistance to heat aging and the degree of vulcanization also were improved. This effective pre-curing inhibitor of the rubber mix based on SKN-40M is technologically efficient. References 7: 6 Russian, 1 Western.
[130-2791]

UDC 678.763.2.028

ACCELERATION OF VULCANIZATION OF CHLOROPRENE RUBBER BY 2-MERCAPTO-DERIVATIVES OF IMIDAZOLE

Moscow KAUCHUK I REZINA in Russian No 2, 1980 signed to press 31 Jan 80 submitted 5 Nov 79 pp 29-31

CHERENYUK, I. P., (Siberian Technological Institute)

[Abstract] A study of the possibility of use as accelerators of vulcanization of chloroprene rubber by 2-mercaptoderivatives of imidazole - 2-mercapto-4-phenylimidazolidine (4FI), 2-mercapto-5-phenylimidazole (5FI) and 2,3,5,6-tetrahydro-6-phenylimidazole (2,1, beta) thiazole (TGFIT) indicated that these new accelerators ensure higher strength and greater resistance to vulcanization reversion of filled rubbers than NA-22. The properties of these rubbers are good, being superior to resins with NA-22 and resins without an accelerator in resistance to heat aging and swelling. Figures 2.
[130-2791]

UDC 541.64:547.315

COPOLYMERIZATION OF BUTADIENE AND ISOPRENE WITH THEIR LINEAR AND CYCLIC DIMERS WITH THE AID OF ZIEGLER-NATTA CATALYSTS

Moscow VYSOKOMOLEKYLARNYYE SOYEDINENIYA in Russian No 2, 1980 pp 385-389 manuscript received 19 Dec 78

MONAKOV, YU. B., GLUKHOV, YE. A., FARKHIYEVA, I. T., KUDASHEV, R. KH., MINSKER, K. S., DZHEMILEV, U. M., TOLSTIKOV, G. A. and RAFIKOV, S. R., Institute of Chemistry, Bashkirian Affiliate of the USSR Academy of Sciences

[Abstract] The copolymerization of butadiene with 3-methylheptatriene-1,4,6 and 1,3,6-octatriene in the presence of the cis- and trans-regulating systems $TiI_2Cl_2+Al(iso\text{-}C_4H_9)_3$ and $TiCl_4+Al(iso\text{-}C_4H_9)_3$, respectively was investigated, as was the copolymerization of isoprene with 2,6-dimethyl-octatriene-1,3,6 and its dimeric analogues in the presence of the system $TiCl_4+(iso\text{-}C_4H_9)_3$. The polymers thus synthesized were found to display a random distribution of monomeric links in the chain. The addition of triene to the basic chain proceeds through the mechanism of a conjugate system of double bonds. The observed inversion of the activities of the investigated dimers upon their copolymerization with butadiene and isoprene in the presence of the

coordination systems is due to the structural features of the diene and of the reactive linear triene with a conjugate system of double bonds, and in particular it is due to the presence of the CH_3 side group. Figures 2; references 21: 14 Russian, 7 Western.
[122-1386]

UDC 631.84:661.717.5

RECOVERY OF CARBAMIDE-FORMALDEHYDE FERTILIZERS FROM CONCENTRATED SOLUTIONS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 1, 1980 pp 22-24

KUZNETSOVA, A. YE. and TARKHANOVA, L. S.

[Abstract] The authors developed a method for producing carbamide-formaldehyde fertilizers (CFF) from solutions of carbamide in formalin. They describe a continuous CFF production process, including a reproduction of the flow diagram, and demonstrate that their method compares favorably to others: shorter reaction time, elimination of filtration and neutralization stage, easier removal of methanol, no discharge or gas blow-out; the waste consists of a vapor condensate most of which is utilized. The process is in current use on an experimental production basis (since 1978) at the Vakhsh Nitrogen Fertilizer Plant with a yield of 10,000 tons per year and there are plans to produce CFF on an industrial scale after refinement of the process, with projected output of 200,000 tons per year, and projected economic effectiveness of 210 rubles per year per ton CFF used on cotton plants. Figures 1; references: 5 Russian.
[135-10,657]

UDC [661.635.213+661.635.223].002.612.3

AMMOPHOS PRODUCTION INVOLVED DECREASED OUTLAY OF PHOSPHORIC ACID

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 1, 1980 pp 24-25

ZOLOTAREV, N. N., LETICHEVSKAYA, N. N., KARPOVICH, L. M., VLEZ'KO, V. P., GELETA, I. A. and BARABASH, I. P.

[Abstract] Tests were conducted at the Sumi division of Khimprom to produce ammophos [ammonium phosphate fertilizer] from phosphoric acid to verify the report based on laboratory tests that less phosphoric acid could be used for this purpose than previously used in industry, with resulting lowering of cost and improvement of fertilizer properties. Apatite was added to phosphoric acid as a replacement of part of the latter, and it was found to yield a 16.2% increase in productivity along with decrease in use of phosphoric acid; the fertilizer obtained meets current specifications. References: 3 Russian.
[135-10,657]

UDC 66.097.3-965.1:661.53

EXPERIMENTAL PRODUCTION TESTING OF GRANULATED CATALYST FOR AMMONIA SYNTHESIS BY THE METHOD OF CONTINUOUS MELTING

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 1, 1980 pp 32-34

MEN'SHOV, V. N., ANOKHIN, V. N., LYTKIN, V. P., SOBOLEVSKIY, V. S. and ZUYEV, A. A.

[Abstract] Since catalytic synthesis from air nitrogen and hydrogen at high pressure is the most profitable method of recovering ammonia, the authors developed, tested and refined a continuous and safe technique for producing granulated, melted iron catalyst for such synthesis that has advantages over the granulation process in liquid. The chemical composition, activity, mechanical strength of SA-1, SA-1G in current use are compared to these properties of a new granulated catalyst, SA-1P. Equations are included for determination of rate of ammonia synthesis, concentration of ammonia in reactive gas, rates of diffusion and catalytic reaction, material balance, with demonstration of superiority of SA-1P. This work was done on an experimental production installation. Figures 4; references: 4 Russian.
[135-10,657]

UDC 661.53.023

INFLUENCE OF FLOW VELOCITY PROFILE IN CATALYST LAYER ON EFFICIENCY OF AMMONIA SYNTHESIS REACTOR

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 1, 1980 pp 41-42

KRASNUSHKINA, N. V., DIL'MAN, V. V. and SERGEYEV, S. P.

[Abstract] Calculations were made, equations for which are submitted, of reactor properties (material and thermal balance; rate of ammonia synthesis, loss of reactor efficiency due to uneven distribution of velocities in catalyst; dispersion) and how they are affected by the flow velocity profile of the catalyst bed [layer]. Figures 2; references: 7 Russian. [135-10,657]

WATER TREATMENT

UDC 628.162.8

DECONTAMINATION OF SEVIN-CONTAINING WASTE WATERS

Moscow KHIMIYA I TEKHNOLOGIYA VODY in Russian Vol 2 No 1, 1980 pp 25-30
manuscript received 6 Jul 79

MARCHENKO, V. M., TARAN, P. N. and SHEVHCENKO, M. A., Institute of Colloid Chemistry and Chemistry of Water, UkSSR Academy of Sciences, Kiev

[Abstract] Sevin (1-naphthyl-N-methyl carbamate) is at present widely used in agriculture as pesticide instead of persistent organochlorine compounds. In the process of its production, diluted waste waters are formed which in addition to Sevin and its metabolite, α-naphthol, include a number of nitrogen-bearing compounds. In accordance with sanitary requirements, the maximum permissible concentration of sevin in water is 0.1 mg/l and oxidability of effluents should not exceed 10 mg O/l. Sevin-containing waste waters, prior to their discharge or chemical treatment, should be decontaminated, but the effective methods for their purification were not yet worked out. The expensive high-temperature incineration cannot be applied because of Sevin's resistance to high temperatures. On the other hand, methods of chemical oxidation are in wide use at present. The authors studied (1975) the action of various oxidants (ozone, chlorine, hydrogen peroxide, potassium permanganate) on aqueous solutions of Sevin and established that ozone is more effective than other agents and that its unit consumption necessary for complete decomposition of Sevin in water is 0.5 per mg of organic substance. Toxiciological investigations of destruction products of Sevin showed that they are nontoxic and noncumulative. Experiments on purification of Sevin-containing waste waters by ozone were carried out on model solutions imitating effluents from washing floors in pesticide-producing enterprises. The composition of these effluents at permanganate oxidability of 105 mg O_2/l was as follows: Sevin 20, α-naphthol 10, dimethylaniline 10 triethylamine 20, and dimethylurea 10. The degree of decontamination was determined from the content of the most toxic component, Sevin, using thin-layer chromatography, and from oxidability of the solution in the process of its treatment. Ozonization was performed in a bubbling-type ozonizer and the amount of ozone absorbed was determined iodometrically. The destruction of investigated compounds in water is determined by their nature and by the rate of ozone inflow into the reaction vessel. The required thoroughness of purification was achieved with the use of 240 mg/l of ozone and the unit

expense of ozone was 2.4 mg per mg of organic substance. The magnitude of permanganate oxidability of the effluent treated did not exceed 10 mg O_2/l and the content of Sevin was less than 0.1 mg/l. Analogous experiments were also carried out using a flow-through bubbling column. As the ozonization proceeded the factor of ozone utilization decreased from 80% to 45%. To reduce losses of the oxidant its reuse is recommended by means of a system of recuperation. Based on the results obtained, a process flow diagram for purification of Sevin-containing waste waters with the use of an OP-121 ozone generator is proposed. The cost of the treatment of Sevin-containing effluents will be 0.1 rouble per m^3. Figures 3; table 1; references 7: 6 Russian, 1 western.
[126-1015]

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DEMINERALIZATION OF SOFTENED WATER BY ELECTRODIALYSIS WITH SIMULTANEOUS PRODUCTION OF HIGHLY CONCENTRATED BRINE

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GREBENYUK, V. D., PISARUK, V. I., STRIZHAK, N. P., PENKALO, I. I. and VOLOSHINA, A. L., Institute of Colloid Chemistry and Chemistry of Water, UkSSR Academy of Sciences, Kiev

[Abstract] The creation of an ED-60 electrodialyzing demineralizer-concentrator, in which the complete hermetization of the brine tract in relation to the demineralization tract has been achieved and a system of the supply and discharge of the solution in the brine tract ensures minimization of current leakages in the brine, has made it possible to carry out the operations of comprehensive treatment of the mine waters, while simultaneously producing a highly concentrated brine. To ensure steady operation of electrodialyzer nothing remains but to exclude the sludging in concentration chambers. $CaSO_4$ is one of the most characteristic sediments that are formed in the process of electrodialysis. The authors studied an imitation of the softened "Petrovskaya" mine water of the following composition: NaCl and Na_2SO_4 - 2.9-2.0 g/l respectively, $CaCl_2$-5.5 g/l, degree of softening - 200, which is achieved in the preliminary stages of treatment and is determined by the value of the maximum permissible concentration of calcium, which excludes the formation of calcium sulfate in the brine chambers. Preliminary verification of the steadiness of demineralization process with simultaneous high brine concentration was performed using a laboratory electrodialyzer (one concentration chamber and two desalting chambers) under

direct-flow operating conditions and flow velocity of solution in demineralization tract equal to 0.3 cm/sec. The area of ion-exchange membranes was 0.1 dm^2 and the intermembrane spacing 5 mm. The electrodialyzer was made to work for about 300 hrs (7 hrs a day). It has been found that no changes occurred in the basic physicochemical properties of ion-exchange membranes and no sediments were detected on them. Since there was a possibility that in the course of the 7-hour work of the electrodialyzer the formation could occur of the crystal nuclei on the ion-exchange membranes and that their dissolution might take place during the subsequent 17-hour interval, a 32-hour nonstop test of the electrodialyzer work was carried out and no significant changes in its performance were ascertained. Thus, it has been demonstrated that it is possible in principle to perform demineralization with simultaneous production of highly concentrated brine using a single electrodialyzer, at small expenditures of energy and sufficiently high current efficiency, under conditions of complete hermetization of demineralization and concentration tracts, minimization of current leakages in the brine and prevention of the formation of difficult-to-dissolve compounds in concentration chambers. Tables 2; references: 4 Russian.
[126-1015]

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PURIFICATION OF NATURAL WATERS FROM ORGANOPHOSPHORUS INSECTICIDES

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KRAVETS, YE. V., LIZUNOV, V. V. and MARCHENKO, P. V., Institute of Colloid Chemistry and Chemistry of Water, UkSSR Academy of Sciences, Kiev

[Abstract] The widespread use of the organophosphorus compounds (OPC) in agriculture for the protection of plants has created a danger of the pollution by them of water supplies. A previous investigation by the authors showed that traditional methods of bleaching and clarification of water do not fully eliminate them. The treatment with potassium permanganate and superchlorination may destroy odors but the danger of the accumulation of toxic substances remains. It has been established that ozonization is the most effective way to eliminate the OPC without formation of the intermediate products. The present investigation was to verify three process flow diagrams of the treatment of water with ozone in order to eliminate the OPC from natural waters. The water studied was taken from the Kiev storage basin, into which the OPC were introduced. The ozone-air mixture was produced from air oxygen in the field of quiet electric discharge using a

laboratory ozonizer. The contact between the ozone-air mixture and investigated solution was achieved in a bubbling glass column and the ozone concentration was determined iodometrically. The qualitative indices and the content of insecticides were determined using thin-layer chromatography and from the content of phosphorus determined in the form of a blue heteropoly complex after extraction of the OPC with chloroform and mineralization. To study the possibility of the use of ozone as a single method of purification, the experiments were carried out on natural water having chromaticity grade 91 (by the bichromate-cobalt scale), pH 6.75 and chlorophos [trichlorphon] content in the amount of 5-7 mg/l. As has been already established earlier, chlorophos in diluted aqueous solutions does not interact with ozone. To detoxicate it, one should first convert it to dichlorophos [ditrichlorphon], which can be achieved through the increase of pH to 8.5-9.0. In separate experiments it was established that the overall hydrolysis and conversion of chlorophos to dichlorophos require 30 min. In another series of experiments the elimination was studied of the OPC from water with ozone after its previous chlorination and coagulation. To this water added were 1 mg/l each of chlorophos, metaphos [parathion-methyl] and carbophos [malathion], and left to stand for 30 min until the completion of hydrolysis of chlorophos, whereafter it was treated with chlorine (8 mg/l), coagulant (40 mg/l, to decrease chromaticity by 50%) and ozone (10 and 20 mg/l), for 10 min. In this case, ozonization permits a decrease of the content of the OPC to 0.01 mg/l (maximum permissible amount) and the bringing chromaticity to normal with much smaller amount of coagulant. The third series of experiments dealt with elimination of the OPC with ozone (5-10 mg/l) after the treatment of water with chlorine (5 mg/l) and coagulant (80 mg/l), as well as after its settling and filtration. The results obtained show that the use of ozone at the end of the process flow diagram after elimination of the main mass of organic substances brings about a destruction of the OPC with lesser expense of oxidant. Under practical conditions it may be necessary to eliminate the residue of the OPC from water containing various organic substances formed, for exmaple because of waterbloom. Such water was modeled by adding from 0.5 to 1 mg/l of indole, phenol, amines, sulfur compounds, volatile acids, synthetic surface-active substances and OPC. Investigated water was chlorinated (5 mg/l), treated with coagulant (aluminum sulfate, 100 mg/l), and filtered, to eliminate colloid impurities, and treated with various doses of ozone for 10-20 min. Before addition of ozone the concentration of OPC practically did not change. Only after addition of ozone its concentration considerably decreased and at more than 20 mg/l it reached the MPC level. The overall elimination of the OPC was observed at a dose of ozone of about 50 mg/l. We may conclude that ozonization may be applied to eliminate the residue of the OPC from natural waters at ozone dose of 20 mg/l, pH 8-8.5, and 10 min duration of treatment. Tables 3; references: 9 Russian.
[126-1015]

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UTILIZATION OF FOSSIL COALS FOR WATER PURIFICATION FROM HYDROCARBONS

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ETTINGER, I. L., SHUL'MAN, N. V., RADCHENKO, S. A., SHLAPAKOVA, E. I. and MURZAGULOVA, YE. A., Institute for Problems of Comprehensive Mastery of Mineral Resources, USSR Academy of Sciences, Moscow; Tula Polytechnical Institute; Ufa Petroleum Institute

[Abstract] The necessity to protect our environment from pollution has considerably increased the need for adsorbents to purify air and water. In the United States the production of the activated carbon reached 130-140,000, in Holland 35,000, and in Japan 47,000 tons annually. But the activated carbon has significant shortcomings--its little durability and high cost. Therefore, the possibility of utilization of the inexpensive natural coals for purification of industrial effluents, or for their additional purification after other methods were employed, has been of a long-standing interest for scientists. This idea was periodically discussed in the scientific press without much practical results so far, which was due to the fact that coals were used without taking into consideration their porous structure. The authors studied three parameters of several hundreds of various fossil coals characterizing porous sorbents: the magnitude of openings and the size of pores and their diameterwise distribution. In the overwhelming majority of coals their specific surface, determined by low-temperature adsorption of nitrogen acc. to Brunauer, Emmett and Teller (BET) method, was less than 0.5 m^2/g, which pointed to an insignificant number of meso- and micropores. The size of pores determined by molecular probe method was found to be equal to 4-5 Å. At these parameters of the sorbent only absorption can occur, for adsorption cannot take place due to the absence of structural interface. Hence one would conclude that the fossil coals cannot be used for purification of industrial effluents from macromolecular pollutants. However, among the little-metamorphosed (long-flame) coals there are varieties which display on their differential curve of pore distribution a second (after micropores) maximum, in which the size of the inlet holes of pores is equal diameterwise to 40 Å, that is that of mesopores. Such coals were named "mesoporous" by the authors. They constitute natural molecular sieves suitable for purification of waters from high-molecular compounds. Unlike other coals, the specific surface of mesoporous coals determined by the BET method is rather considerable (100-150 m^2/g) even if it is inferior in size to that of the macroporous activated carbon (1000 m^2/g). The advantage of the mesoporous fossil coals as natural molecular sieves is that they can replace the scarce and expensive activated carbon and because of their cheapness (18-20 rubles/ton) do not require regeneration. After they were used as water purifiers they can be burned together with ordinary coals, while their caloricity is enhanced due to the retention of organic

compounds. The mesoporous coals were found by the authors to exist in the Donetsk coal basin and in Georgia. The best way to detect them is by using the method of determination of their specific surface from the low-temperature adsorption of nitrogen. The magnitude of the specific surface equal to tens and hundreds of square meters indicates that these coals can be used as molecular sieves. Overall, in the Soviet Union, the reserves of the long-flame coals, including those suitable for water purification, amount to tens of billions tons. The laboratory experiments have established that slightly metamorphosed mesoporous fossil coals are suitable for purification of various industrial effluents from high-molecular organic compounds. Their trials on a semi-industrial scale are being carried on at present. References 8: 7 Russian, 1 Western.
[126-1015]

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